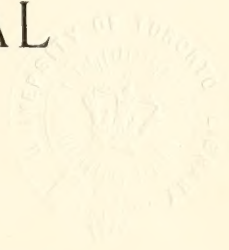


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LONG-TAILED JAPANESE FOWLS

(See page 71)

The American Museum Journal

Vol. IV.

JANUARY, 1904.

No. 1



THE Supplement issued with this number of the JOURNAL takes the form of a General Guide to the exhibition halls of the Museum. It has been prepared for the purpose of facilitating a rapid survey of the collections which have been placed on view. Those halls which have already received extended treatment in the Supplements of the JOURNAL are passed over with few words, in order to devote more space to the remainder. The twelve Guide Leaflets which have preceded this one will be found to supplement it in as many important directions. Other Guide Leaflets to special exhibits and to the halls as units are in course of preparation, and will be issued from time to time.

THE BEHAVIOR OF THE MINERALS AND GEMS OF THE MORGAN COLLECTIONS TOWARD RADIUM AND OTHER SOURCES OF LIGHT.

DURING the past summer, Dr. George F. Kunz, Honorary Curator of Gems, and Professor Charles M. Baskerville, Professor of Chemistry in the University of North Carolina, made a careful study of the action of ultra-violet light, Roentgen rays and radium upon the specimens in the Bement-Morgan and Tiffany-Morgan collections. These collections are the most complete of authenticated minerals and gems on exhibition in the country and give a unique opportunity for the observation of fluorescence and phosphorescence resulting from treatment in the manner indicated. In all, about 13,000 verified minerals and gems in these collections were carefully studied. In addition to these, the investigators submitted to the sources of radio-activity selected stones from about 15,000 British Guiana diamonds, and two particularly handsome diamonds, one of which

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was a tiffanyite, besides several carbonados. The radium preparations used were of the highest activity obtainable, and were secured for the Museum through the liberality of Mr. Edward D. Adams. The results here announced were obtained through the use of radium bromide of 300,000 and radium chloride of 7,000 activity, and with radium barium carbonate of 100 activity, uranium being taken as the standard at 1.

Minerals may be separated tentatively into those which

1. Do not respond to radium, ultra-violet or Roentgen rays.
2. Respond to radium only.
3. Respond to ultra-violet rays only.
4. Respond to Roentgen rays only.
5. Respond to radium and ultra-violet rays (not to Roentgen rays).
6. Respond to radium and Roentgen rays (not to ultra-violet rays).
7. Respond to ultra-violet and Roentgen rays (not to radium).
8. Respond to radium, ultra-violet rays and Roentgen rays.

With ultra-violet rays it was found that minerals from Langban, Sweden, behave differently from the same species from other localities. The obvious suggestion is that here, and at points where similar exceptional results appear, as at Borax Lake, there is present some rare (perhaps new) element, widely diffused in very minute quantities. An illustration is given by the behavior of glauberite; specimens from Borax Lake, California, Laramie and Spain phosphoresce, while specimens from Chile do not.

It is noteworthy that tourmaline, which is so markedly pyroelectric, gives no response; nor does beryl, save in three specimens from Haddam Neck, Conn. American sapphires of various kinds, spinel, chrysoberyl and almost all jades, gave no response to the ultra-violet rays. Most of the gem-minerals, except diamond, opal and kunzite, are little acted upon.

The studies indicate the presence with the zinc in willemite and hydrozincite and in the artificial phosphorescent zinc sulphide and zinc oxide, of some element, probably not yet determined, that possesses peculiar properties, one that in combination with

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a zinc mineral gives high luminosity by the application of radium, or any other radio-active body.

The variable action of fluorspar with the various kinds of rays makes it probable that there exists in that mineral either yttrium or ytterbium, or some other related rare earth, or perhaps several of them.

Some highly active element seems to be present in all of the numerous and complex minerals from Borax Lake, California, but it is not responsive to radium. This is evidently a substance not necessarily radio-active itself, but one possessing the same or allied properties with the substance found with the zinc minerals. A slight exposure for one or two seconds causes all of them to phosphoresce, sometimes for a full minute.

The substance present in calcite from Franklin, N. J., and from Langban and Pajsberg, Sweden, is probably yet another body, as it does not respond to radium; although the willemite found with the calcite at Franklin responds in marked degree not only to radium, but also to actinium, polonium, Roentgen rays and ultra-violet rays. The willemite, furthermore, is triboluminescent, emitting light even when struck against the side of a glass full of water. When powdered, this mineral serves admirably for radio screens, being almost if not quite as good for this and similar purposes as the artificial platinum-barium cyanide. The new lilac-colored spodumene from California, named kunzite by Professor Baskerville (*Science*, September 4, 1903), responds wonderfully to the influence of radium, actinium, polonium, Roentgen rays and ultra-violet rays, and is strongly pyro-electric.

There probably exists in autunite, and another yellow-brown uranium mineral from Texas, a fluorescent substance which differs from anything elsewhere noted in the collection.

In the hyalite, from San Luis Potosi, a volcanic mineral, there is present something that responds with a beauty of color that strikingly reminds one of nitrate of uranium; this may be still another substance.

The most responsive of all, however, whether to radium, actinium, polonium, Roentgen rays, ultra-violet rays or mag-

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nesium light, were the diamonds to which Dr. Kunz gave the name tiffanyite in a paper read before the New York Academy of Sciences in December, 1895. These stones contain a peculiar substance which gives them what is known as the blue-white color. They are fluorescent like anthracene, and hold the luminosity for a long time.

At the meeting of the New York Academy of Sciences held in the Museum on October 6, 1903, Dr. Kunz gave a summary account of his and Professor Baskerville's interesting and valuable investigations, illustrating his remarks with many specimens. The scientific aspect of the studies is discussed in the *American Journal of Science* for December, 1903, and January, 1904.

AN EXTINCT CAVE FAUNA IN ARKANSAS.



GREAT part of the evidence as to the antiquity of Man in the Old World has been found in ancient caves, where his bones or indications of his existence have been found associated with remains of many extinct animals of the Pleistocene Epoch or earlier. But in this country the exploration of caves has until recently yielded very meagre results as to extinct animals, and has added practically nothing to our evidence of the antiquity of Man. Within the last two years, however, explorations conducted by Professor F. W. Putnam and Dr. J. C. Merriam in the Pleistocene caves of California, have brought to light a large series of fossil remains, mostly of extinct species of animals, and recently another rich cave deposit, equally ancient, has been found in Arkansas, and is now being investigated by this Museum. This deposit was discovered by Dr. Teller, and we owe to the good offices of Professor Putnam the opportunity to explore it. Mr. Barnum Brown, who was sent out for this purpose by Professor Osborn last summer, has already succeeded in making a collection consisting of some thousands of specimens of over thirty species of animals, many of them extinct. The collection is especially rich in remains of small mammals such as

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rats, mice, shrews, bats, weasels and hares. No certain indications of Man have yet been recognized, but it is hoped that further explorations may give some definite evidence as to his existence, as this would be the most conclusive proof yet furnished of the antiquity of Man in the New World.

W. D. M.

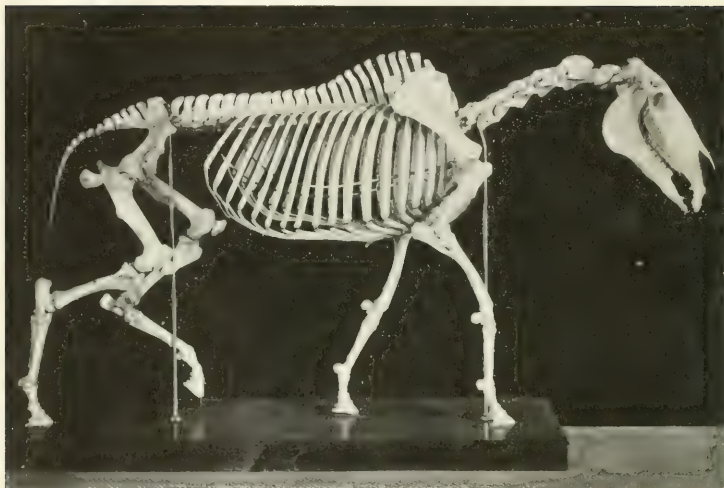
THE LONG-TAILED JAPANESE FOWLS.



THE long-tailed Japanese fowls (see frontispiece) secured for the Museum by Prof. Bashford Dean have recently been mounted and placed on exhibition in the Bird Hall. Professor Dean states that this peculiar breed of fowls has been so long established (it was known in Corea prior to A.D. 1000) that its wild ancestors cannot be determined. It appears, however, to have been developed solely through artificial selection by breeders, from birds in which, because of failure to molt, the tail-feathers continued to grow for an indefinite period. In the Province of Tosa, in the Island of Shikoku (the third largest island of the Japanese group) breeders were encouraged by the Daimyo of the Province to produce fowls with especially long feathers which were of heraldic importance and were used by the Daimyo as decorations for his spear.

The best individuals of this fowl are still grown in the Province of Tosa where Professor Dean procured the specimens now owned by the Museum. The industry, however, probably through lack of governmental support, is now on the wane, so much attention being required to produce long-feathered birds that their breeding is not commercially profitable.

The birds are given high perches as their feathers develop, are fed with great care on nourishing food, and the long feathers are wrapped in mulberry paper to protect them from dirt and abrasion. It is said that a growth of six inches per month has been obtained by proper treatment, and the longest recorded feather measured twenty feet and two inches. The tail of the best developed Museum specimen measures fourteen feet.



DRAUGHT HORSE SIDE VIEW

THE DRAUGHT HORSE IN ACTION.



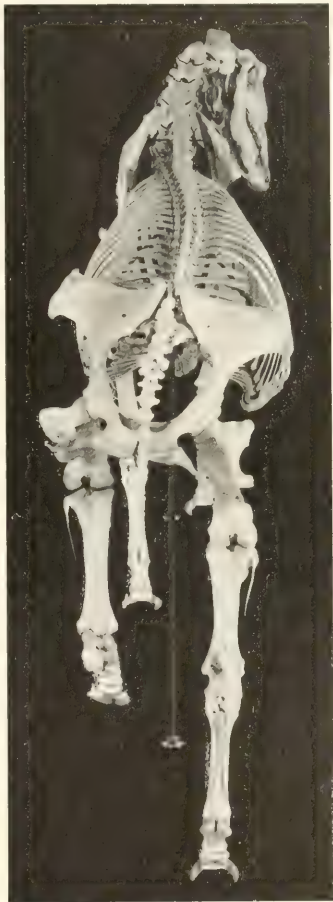
THE latest addition to the alcove exhibiting the evolution of the Horse, as the gift of Mr. William C. Whitney, is a mounted skeleton which represents a draught horse in action.

In the general plan of preparation for this alcove the Curator, Professor Osborn, designed two series: the first, of fossil horses, and of the wild horses, asses and zebras so far as they can be secured, to show the evolution of the Horse in a state of nature; the second, of the domesticated horses, showing the modification of the skeleton as brought about by the artificial selection of man. This double set will give a number of comparisons and contrasts of the most interesting character, for it will demonstrate that natural selection has been quite as effective as artificial selection in producing great extremes of structure.

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The three types selected to show the varieties of the domesticated Horse are, the largest and most powerful form, the Percheron or draught horse, the Shetland pony to show the smallest and least powerful form, and the race horse to show the swiftest form. Of these the draught horse has been finished, the Shetland pony is now in preparation, and Mr. Whitney is interesting himself in the selection of a suitable skeleton of a race horse.

The Percheron horse, the skeleton of which has been prepared to show the draught horse type, was presented by Mr. George Ehret. In life the animal weighed 2160 lbs., and was 5 ft. 6½ inches in height at the withers. Preparatory to the mounting, Mr. S. H. Chubb, who has had entire charge of the preparation of this series under the direction of Professor Osborn, took a large series of photographs of the side, front and rear views of similar horses hauling heavy loads, in order to ascertain as nearly as possible the position of every part of the skeleton when the animal is



DRAUGHT HORSE—VIEW FROM ABOVE AND BEHIND

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so employed. Then began the difficult task of mounting. The result is considered completely successful. It throws light not only upon the osteology of the draught horse, but on the significance of various features of the skeleton in general.

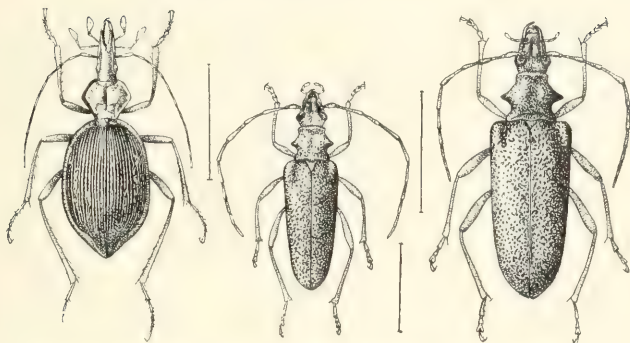
In studying the mounted skeleton we have to imagine that the shoulders rest against a collar, against which the horse is throwing its weight and exerting its energy. To this end the head and body are lowered, the fore limbs acting chiefly as supports, although part of the weight is thrown against the collar. The hind limbs are doing the greater amount of the work; they are the real propellers of the body. In the side view the exact position of each of the limbs is shown, and the flexure of the various joints, also the fact that the backbone is lowered toward the ground and that the head is thrown over to one side.

A still more striking point of view is that from above and behind. We here note that the right half of the pelvis has been lowered and thrown well to the left, so that the right hip joint has been brought much nearer the mid-line than the left. The purpose of this is to transmit the energy from the hind limb as nearly as possible through the central or main axis of the body. This is further facilitated by the curvature of the backbone. At the next moment the left leg will get its "purchase," the right being released; the pelvis then swings to the right side, the curve in the backbone becomes reversed, and the power of the left hind limb is applied similarly along the main axis of the animal; and so on from step to step.

The skeleton of an animal is popularly considered its least interesting part; but this method of illustrating its adaptation for special purposes, by representing it in various kinds of action, immediately transforms the skeleton into a subject of the greatest interest. In fact, the wonderful evolution of the Horse as it will be shown in the fossil series can only be thoroughly understood when taken in connection with the special motions and actions of the living Horse.

The race horse will be mounted as running at full speed; the Shetland pony as in the act of grazing. Another mount, nearly ready for exhibition, is of a rearing horse held in check by a man.

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Cyclops ancicollis, Male.

Anthophilax hoffmanni, Male and female

NEW NORTH CAROLINA BEETLES

DEPARTMENT OF ENTOMOLOGY: EXPEDITION OF 1903.



THROUGH provision made by Mr. Samuel V. Hoffman, the curator of the Department of Entomology, Mr. William Beutenmüller, was enabled to make a trip in May and June, 1903, to the Black Mountains of North Carolina, in continuation of the work of previous years. The unusual rains which prevailed during May prevented full success in the collection of the characteristic species of the season, still about 7,000 specimens were obtained. In the series there are many species not before represented in the Museum collections and some that were new to science. Many scientific data were obtained for use in the preparation of the contemplated work on the Insect Fauna of the Black Mountains, North Carolina, and adjacent Ranges. Some of the new and the rarer previously known species obtained on the present expedition were made the basis of an article which was published in the Museum *Bulletin* during September last. One of the new forms was named *Anthophilax hoffmanni*, or Hoffman's longhorn beetle, in honor of the late Very Rev. E. A. Hoffman, whose interest in entomology and whose friendship for the Museum greatly enriched the Depart-

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ment during his life. This species, figures of which appear on page 11, has bright metallic green forewings and a brassy-black thorax. The beetle lives in the dense evergreen forests which cover the summits of the Black Mountains, and its larva feeds in the wood of the balsam-fir. Among other rareties brought back are several species of the genus *Cychrus*. These beetles, one of which is figured on page 11, devour live snails for food.

THE ARCHÆOLOGICAL EXPEDITION TO THE COLUMBIA VALLEY.



ARCHÆOLOGICAL explorations of the Jesup North Pacific Expedition were carried on in 1897 by Mr. Harlan I. Smith in the Thompson and Fraser River Valleys of southern British Columbia; and in 1898-99 in the shell-heaps along the coasts of British Columbia and Washington. In continuance of the general archæological reconnoissance thus begun in the Northwest, the Columbia Valley was chosen as the field for research during the field season of 1903. The region is exceedingly dry and supports no trees except in the river bottoms, or where irrigation has been successfully prosecuted. The country has come to be known for its production of fruit, hops, hay and wheat raised by means of irrigation.

The Museum already had some heterogeneous collections from the Columbia Valley in the vicinity of The Dalles and Portland which indicated that the prehistoric culture of the region was different from that of either the coast of Washington or the Thompson River country. The latter lies immediately to the north of the Yakima Valley, which was chosen as the base of operations for the new investigations. It was thought that by working in the Yakima Valley the boundary between the culture of The Dalles and that of the Thompson River region might be determined. The material however discovered by the expedition seems to prove that the Yakima Valley was inhabited by people having a culture which previously had been unknown to science.

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In the region were found numerous evidences of the close communication of the people of this culture with tribes of the Thompson River region. Underground house sites, tubular pipes, engraved dentalium shells, a decoration consisting of a circle with a dot in it, and rock-slide sepulchres, each of a particular kind, were found to be peculiar to both regions.

Considerable material of the same art as that found in The Dalles region was seen. It is clear that the people living in the Yakima Valley had extensive dealings both with the tribes northward, as far as the Thompson Valley, and southward, as far as The Dalles of the Columbia. In this connection it is interesting to note that the present Indians of the region travel even more extensively than would be necessary to distribute their artifacts this far. Much less evidence of contact between the prehistoric people of the coast of Washington and that of the Yakima Valley was discovered. A pipe, however, was seen which is clearly of the art of the northwest coast. It was found far up the Toppenish River (one of the western tributaries of the Yakima).

From the Yakima Valley the expedition was transferred to the lower Cowlitz River for work down that stream and along the Columbia from Portland to its mouth, partly to determine whether or not a portion of the evidences of coast culture which were found in the Yakima Valley had not come up the Cowlitz and down the Toppenish River, since the headwaters of the Cowlitz and the Toppenish are near each other. In this region many specimens were secured. The main work, however, was done in the Yakima Valley, where many photographs were taken, not only of archæological sites but also of the country in general. Human remains, which are useful in determining the type of these old people, were also collected.

The most remarkable specimen secured was a piece of antler carved in human form. This was very thin and when found it was nearly as soft as so much sawdust or moulder's sand pressed together tightly. Proper treatment has rendered the object quite hard and able to bear handling. It was found under the vertebræ of a child in a grave. The grave was of peculiar in-

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terest, because, contrary to usual practice, the body had been enclosed in a rude box made by placing about it thin slabs of stone, and the cist thus formed had been covered with jagged fragments of rock, over which earth was spread. This doll-like carving of antler is considered to be one of the finest pieces of prehistoric art ever found in Northwestern America.

On the whole the expedition may be considered particularly fortunate in getting archaeological data and material which tend to prove the occupation of the Yakima region by a people of a hitherto unknown culture.

DEPARTMENT OF VERTEBRATE PALÆONTOLOGY: FIELD EXPLORATIONS IN 1903.



THE past summer was a very successful season for the Department of Vertebrate Palæontology. Five expeditions were in the field, three for fossil mammals, two for fossil reptiles, and all have met with much success. The objects of the expeditions were:

1. *Jurassic Dinosaurs.* The great Bone Cabin Quarry in Wyoming continues to furnish fine specimens of these gigantic extinct reptiles. For this season the prize specimen, found by Mr. Kaison, is a complete skull and the jaws of a great Amphibious Dinosaur, hitherto one of the especial needs of the collection.

2. *Cretaceous Reptiles.* Two years ago Mr. Harry Dougherty of Hat Creek, Wyoming, discovered part of a fossil skeleton not far from his ranch. This specimen was purchased for the Museum by Professor Osborn, and through Mr. Dougherty's courtesy our representative was able to look over the neighborhood where it was found. It seemed to promise well for further discoveries, and accordingly Mr. Barnum Brown was sent out last spring to explore it. He found a number of complete skeletons of Mosasaurs fifteen to twenty feet long, and incomplete skeletons of Plesiosaurs forty feet long. These were great carnivorous marine reptiles, the Plesiosaurs with long snaky neck, while the Mosasaurs were more compactly built.

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3. *Eocene Mammals*. Mr. Walter Granger had charge of this expedition, in southwestern Wyoming, and succeeded in sending in a large and remarkably fine collection of these rare fossils. The series is especially rich in the monkeys, rodents and small carnivora of the Middle Eocene, which until now have been very inadequately represented in our collections.

4. *Miocene Mammals*. Mr. J. W. Gidley was in charge of this expedition, in South Dakota, and obtained a fine skeleton, nearly complete, of the Miocene ancestor of the camels, besides a number of skulls and other fine specimens of extinct Horses, Camels, Carnivores and Rodents of the Upper Miocene, which will greatly add to our representation of these animals.

5. *Pleistocene Cave Mammals* of Arkansas. This collection is referred to on page 6.

SOME EXTRAORDINARY ANTS.



HERE has just been placed on exhibition in the Synoptic Hall of the Museum a collection to illustrate the strange phenomena of gynandromorphism, a subject considered by Professor W. M. Wheeler, Curator of Invertebrate Zoölogy, in a recent paper in the Bulletin¹ of the Museum issued in December.

As the name indicates, a gynandromorph is an animal the body of which is partly male and partly female. The male and female characters may be either blended, as in the cases of male animals with female coloring or sculpture, or *mosaic*, as in animals having the body made up, as it were, of male and female pieces, just as a mosaic pavement is composed of different pieces of marble. The mosaic type of gynandromorphism is the more frequent, though this is merely a relative expression, since all cases of gynandromorphism are extremely rare. The six new cases of gynandromorphous ants described in Professor Wheeler's paper were found only after examining many thousands of specimens during a period of four years. In most of the known cases of gynandromorphism, the body is divided into halves, one of which is male,

¹ Bull. Am. Mus. Nat. Hist., vol. xix, Article xxix, pp. 653-683, 11 figures, 1903.

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the other female (lateral gynandromorphism). This phase of the phenomenon is illustrated in the accompanying figure. Another group of cases comprises anomalies with the anterior portion of the body of a different sex from the posterior portion (frontal or "tandem" gynandromorphism). Still other cases have the dorsal side of another sex (dorsal gynandromorphs). The sexual regions is throughout the the sexual charac-

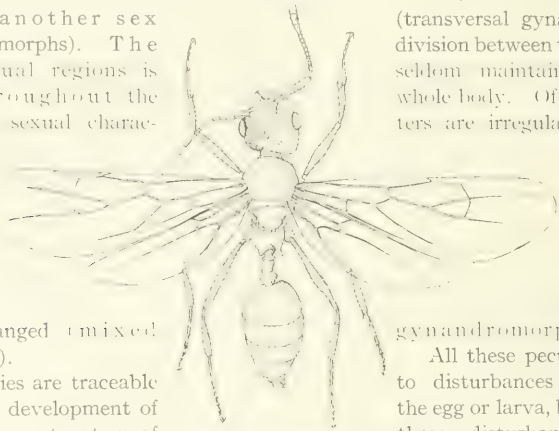
of one, the ventral (transversal gynandivision between the seldom maintained whole body. Often ters are irregularly

arranged (mixed ism).

arities are traceable the development of the exact nature of has not been ascerbe understood until duce such mixed ally. They may re-

of two eggs originally of different sexes, to form a single animal; or they may arise from a single egg in which the fertilization has taken an abnormal course; or again they may perhaps be produced by nutritional disturbances in different parts of the young larva or pupa.

Many gynandromorphs, but not all, are also hermaphroditic; that is, they have both male and female reproductive organs corresponding with the parts of the body contributed by the two sexes. In cases, however, where the whole abdomen is of one sex, the animal is properly a male or female, though its head may



A GYNANDROMORPHOUS ANT

Leptothorax curvispinosus Wheeler

The left half of the specimen is mostly male, and the right half is mostly female. The figure is greatly enlarged.

gynandromorph-

All these peculi-to disturbances in the egg or larva, but these disturbances tained, nor will they it is possible to pro- animals experiment-

sult from the fusion

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be of the opposite sex. Gynandromorphous ants are especially interesting, on account of the great differences between the normal sexual forms. When the characters of the male and female are united in the same individual, some absurdly asymmetrical creatures are the result, such as forms with a big (male) eye and small (male) mandible on one side, and a small (female) eye and large (female) mandible on the other. When the male and worker (that is, abortive female) characters are united in lateral gynandromorphs, we have wings only on the male side of the body, and the thorax on the worker side is defective, etc. The great majority of known gynandromorphs occur among insects, and among these the honey bees and ants have contributed a proportionally very large number of cases.

THE MEXICAN COTTON-BOLL WEEVIL.



NEAR the entrance on the ground floor there has been placed a special exhibit of the Mexican Cotton-boll Weevil, the insect which has been and is doing so much damage in the Cotton Belt of the South. The insect is a beetle (*Anthonomus grandis*) which deposits its eggs in the young cotton boll. The developing larva consumes the cotton-producing tissue within the boll and prevents the formation of the cotton, or greatly injures the product. The exhibit shows the insect in its different stages of growth, together with affected and unaffected bolls. The maps forming a part of the exhibit indicate the recent rapid extension of the pest from its original home in Mexico over the cotton-raising areas of Texas.

Two hundred African butterflies have been given to the Museum by Mr. Samuel V. Hoffman to be added to the great series of butterflies which is the donation of the late Very Rev. E. A. Hoffman.

A WELCOME addition to the insect collections is the series of North American Diptera (Flies) recently presented by Professor William M. Wheeler, Curator of Invertebrate Zoölogy. The collection contains more than 8,000 specimens, representing about 1,000 species. There are types of 169 species.

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CLIMATIC VARIATION IN COLOR AND SIZE OF SONG SPARROWS.

ILLUSTRATING EVOLUTION BY ENVIRONMENT.



THE first exhibit of several designed to illustrate variation in the color and size of birds due to climatic agencies, has recently been placed in the local bird hall and is here figured. It includes the leading types of Song Sparrows, a species which is particularly susceptible to the influences of its environment, no less than twenty climatic varieties, geographical races, or subspecies of this wide-ranging bird being known.

Observe that east of the Rocky Mountains, in a region where climatic conditions are quite uniform, only one well-marked subspecies of Song Sparrow is found; but that west of the Rocky Mountains, where there are widely varying climatic conditions, sixteen subspecies of Song Sparrow are known, twelve of them from California alone.

Note the striking relation between the colors of the various races and the aridity and the humidity of the areas they inhabit. Thus the palest-colored race, the Desert Song Sparrow (No. 5, *Melospiza cinerea fallax*), inhabits the most arid portion of North America, the desert region of Nevada, Arizona and southeastern California, where the annual rainfall averages about six inches; while the darkest-colored race, the Sooty Song Sparrow (No. 2, *Melospiza cinerea rufina*), inhabits the most humid portion of North America, the coast region of British Columbia and southern Alaska, where the annual rainfall may reach one hundred and twenty-five inches.

Note that, in obedience to the law that animals increase in size toward the north, the largest race, the Aleutian Song Sparrow (No. 1, *Melospiza cinerea cinerea*), is the most northern, and, the smallest race, the Mexican Song Sparrow (No. 6, *Melospiza cinerea mexicana*), is the most southern.

Between the lightest and darkest, the smallest and largest, Song Sparrows, however, there is complete intergradation in accordance with the change in the conditions which affect their color and size.

F. M. C.



DISTRIBUTION OF SONG SPARROWS

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DEPARTMENT OF ARCHÆOLOGY: EXPLORATIONS IN THE SOUTHWEST.



ONE of the expeditions sent into the field by the Museum during the past summer was in charge of Mr. George H. Pepper of the Department of Archæology. The scene of operations was the Pueblo Region of New Mexico and Arizona. The object of the trip was not merely the enrichment of the Southwestern Collections of the Museum, but also and more especially the study of the arts and habits of the sedentary people in order that the survival of ancient practices might be detected in the collections which have resulted from former investigations in this part of the country.

In considering the various phases of Southwestern anthropological work, a student has always been confronted with the lack of absolute data concerning the ceramic arts of the various pueblos as viewed in a comparative way. Collections made in the field had, in many instances, been rendered unreliable for scientific study from the fact that all vessels were accredited to the pueblos in which they were found, and were, therefore, looked upon as typical productions of that village. This naturally had a misleading tendency and it was almost impossible for a scientist to make a definite statement concerning the absolute types that might be found in any specified pueblo. There were exceptions of course as the result of monographs by careful investigators who had made a special study of some particular village, but in general no authentic records were available.

Mrs. Robert de Forest of this city, who is an earnest student of ceramics, and Mrs. Phœbe A. Hearst of San Francisco became interested in this phase of the Museum's investigation in the Southwest and liberally coöperated in the plan. Thus strengthened the Hyde Expedition was enabled to carry on the work on a greater scale than otherwise would have been possible.

Mr. Pepper first went to Española and from there visited the pueblos of Santa Clara, San Ildefonso, Pojoaque, Nambe and Tesuque. One of the ceremonial dances at the pueblo of Santa

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Clara was witnessed. San Juan, Picoris and Tesuque next received attention. After this work was completed, the Hopi region was visited, the time selected being the occasion of the Antelope and Snake dances at Walpi. In the pueblos of Hano, Sichomavi and Walpi, special attention was devoted to the work of the Hopi potters, particularly Nampayo of Hano, who is the only one living that has made a careful study of the old pigments and clays.

On the second Mesa the pueblos of Mashongnavi and Shungopavi were visited, and the Snake Dance at Mashongnavi observed. Oraibi, the seventh of the Hopi pueblos, situated fifteen miles to the west of the second Mesa, came next. During the stay in this pueblo the wonderful Flute ceremony was enacted. From the Hopi region the route taken led to the pueblo of Laguna in the western part of New Mexico, and from there to Acoma, where the Fiesta de San Esteban was seen. While in the pueblo of Isleta the Fiesta de San Augustine took place.

Visits to the pueblos of Jemez, Zia, Santa Ana, Ranchitas de Santa Ana, Sandia, San Felipe, Santo Domingo, Cechiti and Zuñi completed the season's work, which included all of the twenty-six "mother pueblos," now inhabited.

The subject of primitive pottery-making as represented in the various groups was carefully considered and the technique of each culture was investigated. Samples of the materials used in the manufacture of pottery were obtained as well as representative forms of finished vessels from each pottery-making pueblo. Nearly one thousand negatives were made to supplement the field notes, and to enhance the value of the exhaustive card catalogue pertaining to Southwestern ceramics, which is now in the course of preparation. The laboratory work is now progressing, and when the vessels have been catalogued and photographed, the set will be divided among the three contributors to the expedition.

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THE EXHIBIT OF CHUKCHEE CLOTHING.

THE Chukchee of Eastern Siberia are divided into two well-marked groups, the Maritime, who live along the coast, and the Reindeer, whose home is in the interior. The mode of life of the two branches offers certain striking differences. For both divisions the climate is hard and the cold in winter extreme, and even in summer the thermometer seldom rises above 45° F. The clothing of both branches is devised with special reference to protection against the extreme cold and the driving winds, and at the same time to allow freedom of movement in the active life which the people lead.

The Reindeer Chukchee, having better skins and furs at their disposal, have developed the winter clothing to a much higher point than their Maritime relatives, while with regard to summer clothing the contrary is the case. Through barter each division has obtained from the other its best kinds of garments, and as a consequence the general character of the clothing worn by the two divisions is the same. All kinds are in the collection.

The chief material used is reindeer skin, that from fawns in the late summer being preferred. This is prepared by tanning or scraping. Sealskin is also used, the preparation being the same. Waterproof suits of the intestines of walrus and seal are also worn in summer, an idea which has been borrowed from the Eskimo. Cloth obtained from American whalers and Russian traders is made into outside garments as a special protection against wind and snow.

The Chukchee man's clothing is very practical, and the cut and style have been adopted by all the neighboring tribes. The suit consists of hood, coat, trousers, boots and mittens of reindeer skin. The coat is a loose, double garment with fur both inside and out. The garment is really two coats, one fitting closely inside the other, which are not fastened together, but can be quickly separated and dried. The double coat is put on over the head, and the neck opening is drawn close with a string. The sleeves are tight at the wrist and very loose at the shoulder, and the skirts are ample. The coat thus permits very free use of the arms and body, and can be slipped on and off easily and quickly.



CHUKCHEE MAN, SHOWING WINTER CLOTHING

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The trousers are made from the skin of the legs of the reindeer, the hair being directed downward so as to shed the snow readily. They are held about the body by a string.

The boots are also of skin, and the soles are made of fur taken from the feet of the reindeer, which is coarse and tough and durable. Stockings of lighter fur are worn. Grass insoles are often placed inside the boots. The boot-legs are slipped under the trousers, which are then tightened about the ankles.

Mittens, likewise of reindeer skin, are made with the hair running up the hand to give a better grip. The wrists of the mittens are slipped inside the sleeves of the coat.

The Chukchee woman's dress is by no means as practical as that of the man. It consists of coat and trousers to the knee in one piece, and is drawn on over the feet through the neck-opening. The sleeves are wide and open, and the neck is cut low, both back and front, affording little protection against the cold. The legs of the suit are loose and baggy. Stockings of reindeer skin are worn, which are thick and bulky about the calves. In order to protect themselves further the women wear overcoats and capes about the shoulders.

Caps as well as hoods are worn by both sexes. They are made of the leg skins of reindeer, dogs and wolves. Some caps, especially those worn by herdsmen and runners, are open at the top. Sometimes the people wear ear-flaps made of thin skin.

Children wear a complete combination suit of fur with a flap which covers the buttocks and is passed between the legs and fastened in front. A pad of moss and reindeer hair is placed beneath this flap to absorb moisture. For purposes of warmth the opening for the hand is not placed at the end of the sleeve, but on the side.

The summer clothing in general is the same in cut and style as that for winter, except that only one thickness of skin is used. Summer boots are made of light sealskin, scraped and smoked. Their cut differs from those of winter and suggests an Eskimo origin. Sometimes the cast-off winter clothing is worn in summer, which tends to give the people a shabby appearance then.



GIANT SPIDER CRAB FROM JAPAN

THE GIANT SPIDER CRAB.



HE Department of Invertebrate Zoölogy has recently placed on exhibition in the Synoptic Hall (No. 107) on the ground floor of the Museum a fine specimen of the largest of all Crustaceans, the Giant Spider Crab, *Kämpferia* (*Macrocheira*) *kämpferi* de Haan, which measures somewhat over 12 feet between the tips of its outstretched claws. This animal is known to occur to a depth of over 2000 feet in the seas off the coast of

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Japan. The largest specimen in any collection is said to be that in the British Museum. It has a spread of 18 feet. Even larger specimens are, however, occasionally captured. One is recorded to have had a spread of 22 feet. The specimen in the American Museum is from Miura-Misaki and was secured by Professor Bashford Dean of Columbia University.

EOCENE FOSSIL MAMMALS OF SOUTH AMERICA.



SERIES of casts of South American fossil mammals of the Eocene epoch has been presented to the American Museum through the courtesy of Dr. Florentino Ameghino, Director of the Museo Nacional at Buenos Aires, Argentina. The rare fossils forming the originals of these casts have only recently been discovered, and all the specimens are in the museums of the Argentine Republic. During Eocene time South America was an island-continent, or perhaps divided into two great islands, and its animals at that epoch were almost as different from those of the rest of the world as those of Australia are to-day. Some of them are considered by Dr. Ameghino to represent very early stages in the ancestry of the elephants; others are ancestors of the fossil mammals of later epochs in the same region, of which the American Museum has a large collection. The casts are exhibited in the South American Alcove in the Fossil Mammal Hall.

NEWS NOTES

THE Department of Invertebrate Zoölogy is placing on exhibition in the Synoptic Hall (No. 107) a collection of Protozoa illustrated by actual specimens and enlarged modes of typical forms. The actual specimens, to be viewed by the visitor through microscopes mounted in the cases for this special purpose, have been prepared for the Museum by Dr. Gary N. Calkins of Columbia University. The series includes beautiful preparations of well-known animalcules like the *Amœba*, *Paramœcium*, *Vorticella*, *Peridinium*, etc. Dr. Calkins will complete the

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series with a set of pathogenic organisms such as the smallpox organism (*Cytoryctes variolæ*) and the malarial organism (*Plasmodium malaricæ*). The enlarged models, in glass and wax, have been skilfully prepared by Dr. Dahlgren. Those of the Radiolarians and Foraminifera are nearly completed.

AMONG noted recent visitors to the Museum may be mentioned the Moseley Educational Commission, comprising more than thirty of the prominent educators of Great Britain, which came in force to examine the building, its halls, and the collections exhibited therein, for the purpose of comparing this museum with those in the British Isles. Mr. Moseley ordered from the Department of Public Instruction one hundred lantern slides illustrating this museum and the schools, academies and universities of the State of New York, and their use by classes of pupils. These slides are to be used by the members of the commission in their lectures in Great Britain on the subject of education and educational facilities in the United States.

DR. T. STORIE DIXON, a trustee of the Australian Museum at Sydney, New South Wales, visited the Museum during November in the course of a tour around the world for the purpose of learning what is being done by museums in general for the education of the people. Dr. Dixon made a thorough inspection of the special educational features here and ordered a series of lantern slides representing the country from Honolulu to New York City and including a full set illustrating this museum.

THE Department of Public Instruction has issued a series of slides illustrating native and ornamental trees. The set consists of seventy-eight views, beginning with the forests of the Adirondack region and ending with the specimens of the Jesup Collection of North American Forestry in the Museum. Some of the more familiar species are illustrated by views of the trees at different stages of growth, the leaf, the trunk, the flower and the fruit.

PROFESSOR VICTOR GOLDSCHMIDT, professor of crystallography in the University of Heidelberg, Germany, spent an afternoon

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recently in close examination of the crystallographic treasures in the mineral collection of the Museum.

THE value of the biograph for use in illustrating lectures upon natural-history topics was demonstrated to the scientific staff one afternoon by an exhibition of rolls of pictures of large and small animals and of microscopic preparations. Among the subjects were the culture of bees, life in aquaria and the circulation of blood in living tissues.

FOUR series of fine skulls and antlers of newly described caribou have been mounted and placed on exhibition on the walls of the east corridor near the halls of mammalogy.

ON Thanksgiving Day a special exhibit was made in the central hall of the main floor showing the different kinds of game birds which are used in connection with Thanksgiving feasts in different parts of the country. The largest and most striking of these of course was the wild turkey, the progenitor of the familiar domesticated fowl. An interesting and little-known fact was brought out upon the label accompanying this exhibit, which was that the turkey, although a native of Mexico, and unknown in Europe before the time of Columbus, was imported into the northern part of the United States from Europe. The supposed origin of the fowl is indicated in its name "Turkey." In other parts of the world, other places of origin are indicated by local names, as, for instance, in France, where the name "Dinde" indicates that the people first supposed the bird to be a native of India.

THE late Homer F. Bassett of Waterbury, Conn., was one of the best-known authorities in the world on the Cynipidæ or Gall-Insects. In the course of his studies he assembled a large collection which was remarkable for the variety and perfection of its specimens. Mrs. Margaret D. Bassett, his widow, has recently given to the Museum the duplicates from this celebrated collection. The material presented contains several thousand specimens of Galls and Gall-Insects, including the types of 68 species described by Mr. Bassett.

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THE Museum has had occasion recently to ascertain the size attained by the horn of the narwhal. The largest of the specimens in its possession is eight feet two inches in length and weighs fourteen pounds. We should be glad to learn the size of specimens held by other museums.

THERE have been added to the collections of the Department of Mineralogy more than 800 specimens of the minerals which occur in the trap rocks of New Jersey. These were collected from the rock taken from the Weehawken Tunnel, and were presented to the Museum by Mr. George W. Talson. The series consists of specimens of calcite, datolite and several zeolites. An exhibition series has been selected from the lot and the remainder is available for the exchange and school suites.

A STRIKING specimen of quartz from Alexander County, North Carolina, is the gift of the American Gem Company through Mr. Lucien Zell. The specimen is a composite crystal consisting of parallel growths of smaller crystals made up of the prism and the pyramid. Many of the component small crystals stand out in high relief. The specimen is about 20 inches across.

THROUGH exchange the mineral collection has been enriched by a beautiful group of chalcedonized turritellas, and a specimen of the cylindrical beryl from Orijarvi, Finland, showing about 18 faces. Other noteworthy additions to the cases are the largest apophyllite which has been found at West Paterson, New Jersey, and a rare specimen of paramelaconite, from Bisbee, Arizona.

SOME of the specimens in the collection of shells have been made the subject of an interesting investigation by Messrs. Coleman and Handich, who have been studying the mathematical nature of the spirals of shells.

THE DEPARTMENT OF GEOLOGY has recently placed on exhibition a series of fossil corals and shells from the Falls of the Ohio, and other localities in Indiana; also a fine lot of crinoids from the noted beds at Crawfordsville, Ind. (see case N), and a

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considerable series of the shells of *Haploscapha grandis*, Conrad, echinoderms and other fossils from the Cretaceous beds of Kansas, which were received at the Museum with the second Cope Collection. *Haploscapha* belongs to an entirely extinct form of shell. It usually is classed with *Inoceramus* which was one of the most abundant and characteristic forms in the Cretaceous seas.

THE WARD-COONLEY collection of meteorites which is on deposit at the Museum was re-arranged and many additions were made during the month of November. The collection now represents 598 falls and finds, which places it at the head of the list of such collections in point of numbers.

AMONG the gifts recently received from the New York Zoölogical Society are specimens of the following snakes: Bush-Master, Anaconda, Water Moccasin, Texas Rattler, Diamond-Back Rattler, Black, Viper and Gopher. These have been mounted and placed on exhibition.

LECTURES.

MEMBERS COURSE

THE Thursday evening Lectures to Members began in November with the following programme for the first course of the season:

November 12.—Dr. EDMUND OTIS HOVEY, "Mont Pelé and the Destruction of St. Pierre."

November 19.—Prof. ALBERT S. BICKMORE, "The Development of New York City."

December 3.—Prof. ALBERT S. BICKMORE, "Niagara."

December 10.—Prof. ALBERT S. BICKMORE, "Germany: Berlin."

December 17.—Prof. ALBERT S. BICKMORE, "Germany: Potsdam."

January 7.—Prof. HENRY F. OSBORN, "The Evolution of the Horse."

January 14.—Mr. FRANK M. CHAPMAN, "Island Bird Life."

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January 21.—Prof. WILLIAM MORTON WHEELER, "Mimicry and Protective Coloring in Animals."

The programme for the second course is:

January 28.—Prof. FRANZ BOAS, "The Scientific Results of the Jesup North Pacific Expedition."

February 4.—Mr. GEORGE H. PEPPER, "The Navajo and other Blanket-Makers of the Southwest."

February 11.—Mr. A. F. BANDELIER, "The Island of Titi-caca."

February 18.—Prof. LIVINGSTON FARRAND, "The Work of the American Museum among the Indians of California."

February 25.—Mr. ANDREW J. STONE, "Collecting Large Arctic Mammals."

March 3.—Prof. ALBERT S. BICKMORE, "Holland: Amsterdam and Haarlem."

March 10.—Prof. ALBERT S. BICKMORE, "Holland: Rotterdam and The Hague."

March 17.—Prof. ALBERT S. BICKMORE, "Belgium: Antwerp and Bruges."

March 24.—Prof. ALBERT S. BICKMORE, "Belgium: Brussels and Waterloo."

TEACHERS COURSE

THE next course of Lectures to Teachers will be given by Prof. Albert S. Bickmore Saturday mornings, in accordance with the following programme:

January 23 and 30.—Holland: Amsterdam and Haarlem.

February 6 and 13.—Holland: Rotterdam and The Hague.

February 20 and 27.—Belgium: Antwerp and Bruges.

March 5 and 12.—Belgium: Brussels and Waterloo.

LEGAL HOLIDAY COURSE

THE lectures in this course are by members of the scientific staff of the Museum and are open to the public. No tickets are required for admittance. Five of the lectures have been given, but two remain to be delivered.

Labor Day, September 7, 1903.—Mr. FRANK M. CHAPMAN, "Bird Life about New York City."

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Election Day, November 3, 1903.—Mr. GEORGE H. PEPPER, "Life among the Navajo Indians."

Thanksgiving Day, November 26, 1903.—Prof. ALBERT S. BICKMORE, "The Development of New York City."

Christmas, December 25, 1903.—Prof. ALBERT S. BICKMORE, "Germany: Berlin and Dresden."

New Year's, January 1, 1904.—Prof. ALBERT S. BICKMORE, "Niagara Falls."

Lincoln's Birthday, February 12, 1904.—Dr. EDMUND OTIS HOVEY, "Mont Pelé and the Destruction of St. Pierre."

Washington's Birthday, February 22, 1904.—Prof. ALBERT S. BICKMORE, "Holland: Amsterdam and Haarlem."

PUBLIC-SCHOOL COURSE.

THE lectures to the general public, provided for through co-operation with the City Board of Education, will continue throughout January, February and March, in accordance with programmes which are to be obtained at the entrance.

MEETINGS OF SOCIETIES.

THE programme for the meetings of the New York Academy of Sciences in January, February and March is:

First Mondays, Section of Astronomy, Physics and Chemistry

Second Mondays, Section of Biology.

Third Mondays, Section of Geology and Mineralogy.

Fourth Mondays, Section of Anthropology and Psychology.

All these meetings are held in the Museum and the public is invited to attend them.

THE Linnean Society holds its regular meetings at the Museum on the second and fourth Tuesdays of each month, while the Entomological Society meets on the first and third Tuesdays.



THE AMERICAN MUSEUM OF NATURAL HISTORY: SOUTH FACADE

A
GENERAL GUIDE
TO THE
AMERICAN MUSEUM
OF
NATURAL HISTORY



NEW YORK
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Guide Leaflet No. 13

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HISTORICAL NOTE.

THE American Museum of Natural History dates its official history from April 6, 1869, when the State Legislature at Albany passed an act creating "a body corporate, by the name of 'The American Museum of Natural History,' to be located in the city of New York, for the purpose of establishing and maintaining in said city a Museum and Library of Natural History; of encouraging and developing the study of Natural Science; of advancing the general knowledge of kindred subjects, and to that end of furnishing popular instruction and recreation." This legislation was the outgrowth of an agitation which extended over several years and which finally culminated through the opportunity presented the preceding year (1868) of purchasing the Elliot collection of North American birds and the Maximilian and Verreaux collections of birds and mammals. Among other fundamental collections of the Museum may be mentioned those in entomology presented by Baron R. Osten-Sacken and Mr. Coleman T. Robinson.

The first home of the Museum was in the Arsenal building in Central Park near Sixty-fourth Street, but the building was old and entirely unsuited to the purposes of a great museum and steps were taken at once looking to the erection by the city of a fireproof structure, expressly for the housing and proper exhibition of the collections. That part of Central Park known as Manhattan Square was set apart by statute for the accommodation of the building and on June 2, 1874, President Grant laid the corner-stone of the first section of the great structure which is eventually to occupy the whole of the eighteen-acre plot bounded by Central Park West, West Seventy-seventh Street, Columbus Avenue and West Eighty-first Street. Three years later this wing was opened to the public.

The first president of the institution was Mr. John David Wolfe. His term of office was short, 1869-1871, being terminated by his death only a few months after the opening of the exhibition halls in the old Arsenal building. Mr. Wolfe was succeeded by Mr. Robert L. Stuart, who held the presidency from 1871 to 1881, when failing health compelled him to resign. Two events signalized this period: the occupancy of the first section of the building in Manhattan Square, and the purchase of the James Hall Collection of Geology and Palæontology. The presidency of Mr. Morris K. Jesup began in 1881 and

has seen the Museum develop into an institution of more than national importance and of world-wide influence. During the first year of his incumbency, Mr. Jesup donated the collection of North American Woods and established the Bulletin, a medium for the publication of the scientific work of the institution which is now in its twentieth volume.

Other features of the past twenty-three years have been the establishment of the Department of Public Instruction in 1885 through coöperation with the State; the establishment of the Department of Vertebrate Palæontology in 1891 through Professor Henry F. Osborn; extensive explorations among the ancient ruins of Peru and South America, begun through the generosity of the late Mr. Henry Villard; the presentation by Mr. J. Pierpont Morgan of the Tiffany gem collections and the Bement Mineral Collection; the provision by the Duke of Loubat of the means for the collection and acquisition of the archæological series from Mexico and Central America, and the inauguration of the Jesup North Pacific Expedition. This period, furthermore, has witnessed the erection by the City of the entire imposing south façade of the building as originally projected.

E. O. HOVEY,
Editor.

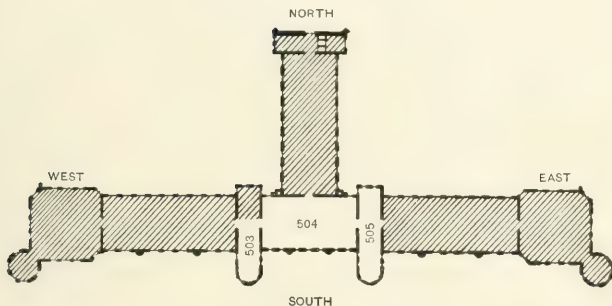
NOTE.—It is suggested that visitors take the elevator to the top (fifth) floor and then descend from floor to floor at their leisure. Frequent reference to the diagrams will prevent confusion.



THE READING-ROOM. NO. 503

GENERAL GUIDE

FIFTH FLOOR



This floor is largely occupied by offices, laboratories etc., in use by the members of the administrative and scientific staff. (In the diagram these rooms are cross-lined.)

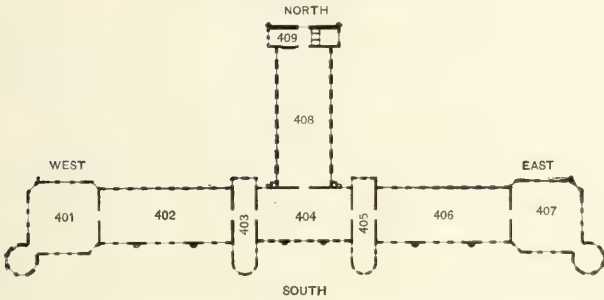
The Shell Hall (No. 504) contains the following collections: A general collection illustrating systematic conchology comprising the combined Jay-Wolfe (1873), Haines (1895) and **Collection of Shells.** Crooke (1893) Collections. The D. Jackson Steward **Collection**, presented in 1890, illustrates the Lamarckian system of classification. The material in this hall is fully labeled.

The Museum Library and Reading-Room (No. 503) is entered from the western end of the Shell Hall. Here will be found about 50,000 volumes on natural history sub- **Library and** Library and Reading-Room. subjects and a comprehensive selection of the current **Reading Room.** scientific journals. The Library is open to the public.

The visitor should now return through the Shell Hall and descend to the floor below.



FOURTH FLOOR



The visitor now finds himself in the Marine Reptile Corridor (No. 405) on the walls of which are displayed several remarkable fossils. The largest of these is of a Mosasaur, a huge marine lizard, 30 feet in length. On the easterly wall are several Ichthyosaurs; one of these will be seen to be accompanied with young. Fossil Reptiles.

The Anighito meteorite, weighing more than 6,000 pounds, is temporarily installed in this corridor.

Passing now towards the east, one enters the Hall of Fossil Mammals (No. 406). The general arrangement of this hall is on the "alcove plan." The collections of the department include the famous Cope Collection. Along the north side are groups of fossils illustrating among other forms the origin and development of Primitive Hoofed Mammals, Carnivores, Mastodons, Elephants and Even-toed Hoofed Mammals. Along the south side the Titanotheres, Rhinoceroses and Horses receive special treatment. Watercolor restorations show the supposed appearance in life of some of these remarkable animals. The specimens are elaborately labeled and there are special Guide Leaflets, "The Collection of Fossil Vertebrates" and "The Evolution of the Horse," which may be borrowed or purchased of the attendant. Fossil Mammals.



MORGAN HALL OF MINERALOGY. NO. 404

Turning to the west and again passing through the Reptile Corridor one enters a stately room (No. 404) devoted to minerals and in recognition of Mr. J. Pierpont Morgan's many **Mineral** gifts to the Museum named the Morgan Hall. Here **Collection.** are the Bement Collection of minerals and meteorites, certain splendid crystal groups from various donors and the cabinet of the New York Mineralogical Club. There is a special guide for this hall. Copies will be found attached to the cases and they may be purchased of the attendant.

The specimens in the table cases have been arranged strictly in accordance with the sixth edition of Dana's *System of Mineralogy*. The beginning of the series is in the southeast corner of the hall. The Sulphur specimens (Cases 1, F and J) arrest attention on account of their beauty and their strikingly perfect crystallization. Particularly choice are the specimens of Gold (Case 1). The mineral is shown here in sheets like rolled metal; in plates with crystalline edges; in matted filaments consisting of minute octahedra; in grouped octahedra with hollow faces, and in twisted plates attached to quartz. Copper is another native element which occurs in fine crystals (see Case 1). Among the sulphides (Cases 1, 2 and A) Stibnite, the sulphide of antimony, Galenite, the sulphide of lead, and Sphalerite, the sulphide of zinc, are valuable ores and at the same time beautifully crystallized minerals. Pyrite (Cases 2 and C), the sulphide of iron, is a very common species which is prized in every exhibition collection on account of its showy brilliant cubes, dodecahedra and other crystal forms. Fluorite (Cases 3 and 4), Quartz (Cases 4, 5, H, P), the Iron Ores (Cases 6 and 7), Calcite, Malachite and Azurite (Cases 8, 9, 10, I, J), Beryl, including Emerald and Aquamarine (Case 12), Tourmaline (Cases 15, 16 and K), Barite (Cases 23, Q) and Crocoite (Case 24) are among the specialties of the collection which should not escape the notice of the visitor.

This collection, which probably forms the best exhibition series of mineral specimens in the country, is almost entirely the gift of Mr. Morgan.

The Museum collection of meteorites, which is one of the largest in the country, has been placed temporarily in **Meteorites.** Cases 25 and 26. The collection contains many rarities.

The loan collection of the New York Mineralogical Club, containing a large proportion of the minerals which have been found on Manhattan Island and in the immediate vicinity, occupies Case 27. Case 28 (in the northeast corner of the hall) is devoted to several series introductory to the study of mineralogy, such as models of crystal forms and specimens to illustrate the exact meaning of the various descriptive terms used in the science.

To the west lies the Gem Room (No. 403). The gem collection consists of the exhibits made by the Tiffany Company at the Universal Expositions held at Paris in the years 1889 and 1900. It was given to the Museum by Mr. Morgan, who frequently adds to the collection. Especially noteworthy are the series of Corundums (Sapphires), Topazes, Beryls, Garnets and Tourmalines. These show a variety in color and tone that is not generally familiar to the public. Uncut gem materials and crystals are exhibited in connection with the gems. Observe the assemblage of cut and carved semi-precious stones, such as Rhodonite, Jadeite and Jade, and several forms of Quartz, especially Rock-crystal and Amethyst. Several masses of Amethyst are among the most remarkable that have been found. The Morgan Collection of gold coins of the United States is here, containing a nearly complete series of the issues from the Philadelphia mint.

The Copper Queen case exhibits a wonderful series of specimens donated by the Copper Queen Consolidated Mining Company from their mines at Bisbee, Arizona. Note especially the large specimens of "velvet" and ordinary Malachite and Azurite, the green and blue carbonates of copper which for many years formed the sole ores of the mine.

Continuing toward the west the visitor next enters the hall of Mexican and Central American Archæology (No. 402), known as the Loubat Hall, on account of the preponderance of material presented to the Museum by the Duke of Loubat.

The key-diagram at the east entrance will assist the visitor in orienting himself in regard to the hall.

The collections have been arranged so as to illustrate the several "cultures" of the region. The word "culture" is used to comprise all the items which go to make up the general life of a people or a race. Filling the eastern portion of the hall are casts and collections, partly from Mexican and Central American Archaeology. Copan, showing many features of the life of the ancient Mayas, while the west central portion of the room is occupied by the collections from the neighborhood of the City of Mexico which show the culture of the ancient Aztec or Nahua race. The casts of the so-called Calendar or Sacrificial stones are of popular interest, and the ancient codices, or pre-Columbian charts or books, are worthy of special study. Cases illustrating the old Tarascan, Mixtecan-Zapotecan and Costa Rican cultures are in the northwest, southwest and southeast corners of the room respectively. One of the most remarkable single specimens in the room is a life-size terra cotta human figure which was found in a cave near the city of Texcoco, Mexico, and which seems to be the portrait statue of some great war chief of the prehistoric Alcolhuan tribe. The specimen indicates that this ancient people had carried the art of working in clay to a high degree of perfection. The collection is particularly rich in objects made from jadeite, gold and copper, and in ceramics. The major portion of the exhibits in this room consists of casts of the carved stelæ and other stone monuments found throughout the region. Among the most celebrated of these is the huge Turtle Stone. The meaning of the emblems and inscriptions carved upon this and other stones has been but partly determined.

Casts of two stelæ from the ruins of Quirigua, Guatemala, are in Hall No. 202 (second floor), on account of their height.

Hall No. 401 not yet being open to the public the visitor should retrace his steps, pass to the middle of Morgan Hall and then enter the Hall of Geology (No. 408).

The rocks and fossils displayed in this room illustrate in general the geology of North America and Europe and in particular the geology of New York State. The oldest rocks will be found in the northeast corner and the succession of rocks



LOUBAT HALL OF MEXICAN AND CENTRAL AMERICAN ARCHÆOLOGY. NO. 402

and their contained organic remains ("fossils") may be followed by examining the cases along the east, south and west sides respectively. The specimens in the desk cases along the center of the hall correspond as nearly as practicable to the neighboring alcove cases. The classification of the collection is first according to the great sub-divisions of geologic time, then according to geographic provinces and finally according to the principal biologic groups represented. The European fossils are arranged in the northwestern quarter of the hall. Geology and
Invertebrate
Palæontology.

The prominent feature of the collection is the great series of types and figured specimens which it contains. There are here 8,345 such specimens representing 2,721 species and 190 varieties. Three-fourths of these are from rocks of Palæozoic age. The foundation of the whole exhibit is the famous James Hall Collection of fossils and rocks from New York and corresponding western strata which was purchased by the Museum in 1875.

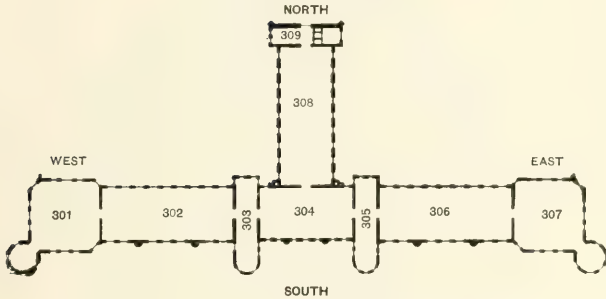
In the northern part of the center of the room the Ward-Coonley Collection of meteorites is temporarily installed. This contains representatives of about 600 falls and finds, and is the largest and most important collection in the country.

Returning through the geological and mineralogical halls to the Reptile Corridor (No. 405) we descend to the floor below.



HALL OF GEOLOGY AND MINERALOGY. NO. 408

THIRD FLOOR



The corridor (No. 305) contains the Osprey Group. The birds, nest and accessories forming this group were obtained on Gardiner's Island, where exists the largest colony of Ospreys or Fish Hawks known within 100 miles of New York City.

Turning now to the east the visitor finds himself in Hall No. 306 which is devoted to mammals and insects. The mammals installed in this hall are mostly Old World ungulates, marsupials and edentates. **Mammals.**

The cases along the top of the gallery railing are devoted to insects. At the right (south) is part of the general collection of Butterflies. Silkworm Moths, Cecropia and other moths are directly in front of the entrance. One case **Insects.** contains specimens illustrating the protective coloration of insects. The next case shows protective mimicry. Among the Beetles particular attention will be attracted by the Longhorns or Cerambycidae, the Leafhorns or Scarabæidæ (among which are the Hercules Beetles from the West Indies, Mexico and Africa), the Stag horns or Lucanidæ, and the Sawhorns or Buprestidæ. The last have wing-cases which are remarkable for their green iridescent colors.



TERMITE NEST, THREE FEET HIGH. IN HALL NO. 307

The next hall to the east (No. 307) is devoted entirely to Entomology. At the entrance is a large case containing specimens of Termites' nests from Colombia, Jamaica and the Bahamas. Owing to their resemblance in appearance and in habits to ants, Termites are often incorrectly called "White Ants." They are found in the warmer parts of the world and are both useful and injurious. In uninhabited districts they feed mostly on dead wood, and are the means of clearing the forests of decayed trees. Insects.

At the north of the entrance is the Jesup Collection of Economic Entomology, illustrating the life history of insects injurious to timber and shade trees. Each exhibit consists of the leaves or other affected parts of the tree, together with the chrysalis, the larva and the adult of the species. Each is accompanied by a descriptive label. Jesup
Collection.

This hall contains the collection of butterflies of America north of Mexico, and from other parts of the world, which was donated to the Museum by the late Very Rev. E. A. Hoffman Hoffman. It contains about 2,000 species, represented by more than 5,000 specimens from Mexico, Central and South America, India, Malay Islands, Australia, Japan, Africa and Europe. The North American butterflies are installed in four cases along the west side of the hall, and nearly all the species found in this country are represented. Among the most noteworthy species in the general series of the collection are the Brilliant Blue Morphos, Owl-faced Butterflies (*Gnigo*), the Swallowtails (*Papilio*) and the Citron, Orange, Lemon and White Butterflies belonging to the family Pieridæ. A beautiful example of *Papilio homerus* from Jamaica, B. W. I., and one of *Dynastor napoléon* from Rio Janeiro, Brazil, as well as many other rarities, are in the collection. Hoffman
Butterflies.

The railing-cases of the gallery are filled with a collection of insects from New York City and vicinity. Passing to the left from the entrance the visitor sees in sequence the galls and their insects, the Bees (Hymenoptera), the Dragonflies (Neuroptera), the Grasshoppers (Orthoptera), the Beetles (Coleoptera) in extensive series, and the Butterflies and Moths (Lepidoptera). Guide Leaflets to the Butterflies (No. 7) Local
Insects.

and to the Hawk Moths (No. 10) have been issued, copies of which may be borrowed or purchased from the attendant.

Having now completed his survey of the exhibits in the East Wing the visitor will retrace his steps through Halls No. 307, 306 and 305 and enter the Central Hall (No. 304) where he may continue his study of the collections of mammals and birds.

The main portion of this hall is devoted to the collection of Monkeys, Lemurs, Bats and Rodents. Special popular interest centers around Case C, which is devoted to the group **Mammals.** representing a family of Borneo Orang Utans in the tops of durio trees, and around Case F, which contains the gorilla and the well known chimpanzees which in life went by the names of "Mr. Crowley," "Kitty Banana" and "Chico."

Some small bird groups are here: Scarlet Tanager, Wilson's Phalarope, Red-winged Blackbird, Water Ousel or Dipper.

The case in the southwest corner of this hall contains temporarily specimens of fish and reptiles, including a 24-foot python.

Visitors are recommended now to pass into the North Wing, Hall No. 308, which is devoted to the Birds of North America.

The upright cases in this hall contain the series of specimens illustrating the bird-life of the continent, arranged according to **Birds of** the generally received classification, which is that of **North** the American Ornithologists' Union. Study of this **America.** room should begin at the right of the south entrance. The general order of sequence is that the water birds precede the land birds. There are many groups in this hall showing birds in their natural surroundings, as nearly as practicable. At the south entrance is the group of Coot (Mud Hen) and Yellow-headed Blackbird; then at the right is the large Cobb's Island group showing the bird-life of the beaches of the Virginia coast. Six species of beach-breeding birds are represented. In the alcoves along the right (east) side of the hall are eleven small



THE GROUP OF BEACH-BREEDING BIRDS OF COBB'S ISLAND. IN NORTH AMERICAN BIRD HALL, NO. 308

groups illustrating the nesting habits of common local birds, such as: the Catbird, Oriole, Humming Bird, Sparrow etc. At the west of the south entrance one finds the large Bird Rock group showing seven species of sea birds as they nest on the rocks forming Bird Rock Island in the Gulf of St. Lawrence. Guide Leaflet No. 1 contains a full description of the Bird Rock group. It will be found attached to the case or copies may be purchased from the attendant. In the alcoves along the west side of the room are sixteen groups illustrating the Robin, Thrush, Vireo, Warbler, Sparrow etc. At the north entrance is the Passenger Pigeon group, representing a bird which man himself has rendered almost extinct within twenty years.

Returning through this hall and the Central Hall (No. 304) the visitor will find in the West Corridor (Hall No. 303) the **Local Birds.** collection of the birds occurring in the vicinity of New York City. Of special interest is the Seasonal Collection, which is arranged around the south end. One of the cases contains a series to illustrate the bird-life of the current month. Series of bills, tarsi, feet, wings, tails and feathers form an exhibit illustrating and defining in graphic manner the technical terms used in descriptive ornithology. A guide to the local collection will be found attached to the cases or it may be purchased from the attendant.

From this corridor one passes into Hall No. 302 of the West Wing, which is devoted to the Ethnology and Archaeology of South America. The collections relate principally to the prehistoric peoples of Colombia, Bolivia and Peru, arranged along the right (north) side of the hall in the following order:

14	Chile	13	Ch. Mesqui	12	Paleolano	11	El Inca y Peru	10	Tiahuanaco	9	Huata	8	Copacabana	7	Sillustani	6	Cuzco	5	Coast of Peru	4	Calamarca	3	Amazonas	2	Equador	1	Colombia
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In each of the cases the specimens have been installed in order corresponding to the following diagram:

Animals.	Warfare	
Decorative Art.	Amusement.	House Life (three shelves).
Modes of Personal		
Adornment (two shelves).		Industries (two shelves).
Religious and Other		
Ceremonials (two shelves).		Natural Products and Food.

DIAGRAM SHOWING THE DISPOSITION OF SPECIMENS IN EACH OF THE SYSTEMATIC EXHIBITS
ILLUSTRATING THE CULTURE OF FOURTEEN LOCALITIES IN ANCIENT SOUTH AMERICA

Many gaps will be observed in these cases, but it is hoped that these will be filled by future acquisitions. Drawings will be found exhibited in connection with the collection which illustrate the manner of use of obscure objects.

In the remainder of the hall the collections have been arranged so as to bring together all the specimens of the same material or character and thus to aid other lines of comparison. **Objects in Metal.** It should be remembered that these collections illustrate a culture that existed in this continent before the advent of the Europeans. One of the special collections contains a choice series of objects made from gold, silver and bronze, among which special attention will be attracted by the cup of beaten gold from Peru, the ornaments of cast gold from Colombia, images of human beings, llamas and other animals in hammered silver and a sea-shell inlaid with parrots cut from sheet silver. Other cases contain a wealth of copper implements. These comprise agricultural implements, bracelets and other personal ornaments, tweezers, battle axes etc. I-clamps of copper used for

fastening together the stones of a building are here. They were found in the prehistoric ruins of Tiahuanaco, Bolivia.

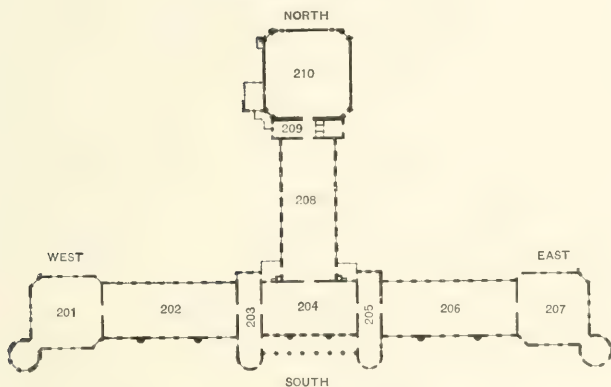
In the large case at the south of the east entrance there is a series of mummies and mummy-bundles illustrating the burial customs of the ancient Peruvians. The next upright **Mummies.** case contains a unique series of skulls showing the various ways of deforming the head practised by the ancient Peruvians, and a still more remarkable series of trepanned skulls from the same region proving a high degree of surgical skill among these ancient people.

Another case displays the collection of musical instruments of the Incas. Guide Leaflet No. 11 describing this remarkable **Musical In-**series is attached to the case for convenience of reference. It may be purchased of the attendant. The **Pottery.** next case contains pottery representations of animals. These were made by the ancient Peruvians and illustrate more than fifty species. The southwest quarter of the hall contains cases illustrating the ethnology of Panama, Brazil and Paraguay. At the west end is a collection of prehistoric pottery in extensive series arranged according to its geographical distribution.

The corner hall (No. 301) of the West Wing contains the extensive collections made in China with the aid of funds provided by the Committee on East Asiatic Research. This hall is in process of arrangement and is not yet open to the public.

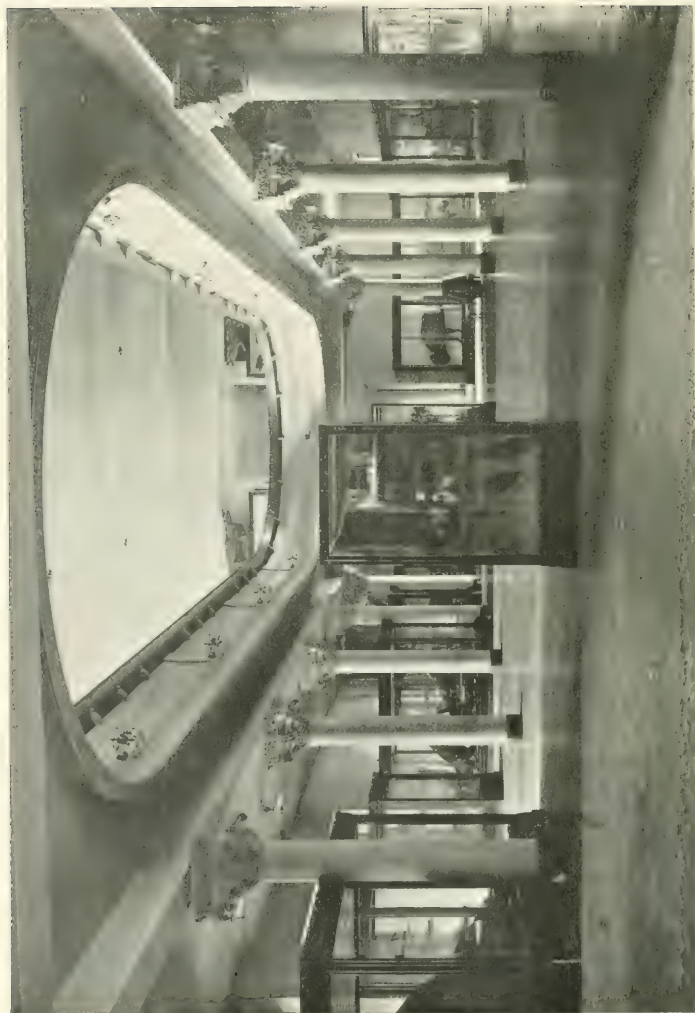
Return to the East Corridor (No. 305) and descend to the floor below. On the walls of the stairway are displayed a series of the antlers of several species of Caribou from the northern portion of the continent. They are typical of four species.

SECOND FLOOR



In the East Corridor (No. 205) of the second or main floor a fine head of the rather rare African Elephant is to be seen on the wall opposite the elevators. Turning to the east, the visitor finds himself in the Hall of North American Mammals (Hall No. 206). The principal exhibits in this room are the large central groups representing the Moose and the Bison or Buffalo. The Moose group pictures the animal as it is found in the forests of New Brunswick. It is the most elaborate group of its kind exhibited in any Museum. As one item of detail, it may be mentioned that twenty-two thousand artificial leaves enter into its composition. The Bison is one of the animals which man has rendered practically extinct within the last thirty years, hence this group is of especial importance.

Some of the single specimens in this hall are particularly noteworthy, such as: the Walrus collected on the Peary Relief Expedition of 1895, showing a fine bull and a cow, the Elk, the Virginia Deer. The last two in particular are considered excellent examples of modeling. Guide Leaflet No. 5, entitled "North American Ruminants" describes in detail a portion of the collection placed in this hall. It may be borrowed or purchased of the attendant.



MAMMALS AND BIRDS. CENTRAL HALL, NO. 204

The visitor will now turn back from this room and continue his studies in the Central Hall (No. 204). The wall cases are devoted to the general collection of Mammals, and in the lobby are exhibited the skeletons of the elephants "Jumbo" and "Samson" and the mounted skin of the Central Park elephant "Tip." The group of the Spotted Hyena is a life-like representation of that beast of prey. The Fur Seal, the animal supplying the fur for sealskin garments, is represented by excellent specimens.

In this hall there are several bird groups; among them the Brown Pelican, the Duck Hawk, the Red-shouldered Hawk and the Lesser Blue Heron may be mentioned.

The visitor should now pass into the North Wing (Hall No. 208), where he will find the general collection of birds. The series may be studied from the southeast corner as a starting point, where specimens of flightless birds are exhibited.

The student should pass toward the north along the east side of the room and return along the west side. In general, the water birds come first and then the land species. The Museum collection of birds' eggs is very extensive. The portion on exhibition may be found in the east section of the hall. Among the numerous groups especial attention is called to those representing the Ptarmigan and the Labrador Duck. The Museum series of specimens of the Labrador Duck is one of the features of the collection. It contains seven of the forty-odd known specimens. Among the other great rarities in the collection is the specimen of the Great Auk. Only four such specimens are known to be in this country. The bird became extinct about sixty years ago.

To the north of this hall is the entrance to the gallery of the large Lecture Hall (No. 210).

Retracing his steps through the Central Hall (No. 204), and turning to the west, the visitor finds himself in the West Corridor (No. 203), which contains the collection of mammals found in the vicinity of New York City. These species are represented by groups comprising the Opossum, Raccoon, Red Fox, Woodchuck and fourteen other familiar animals.



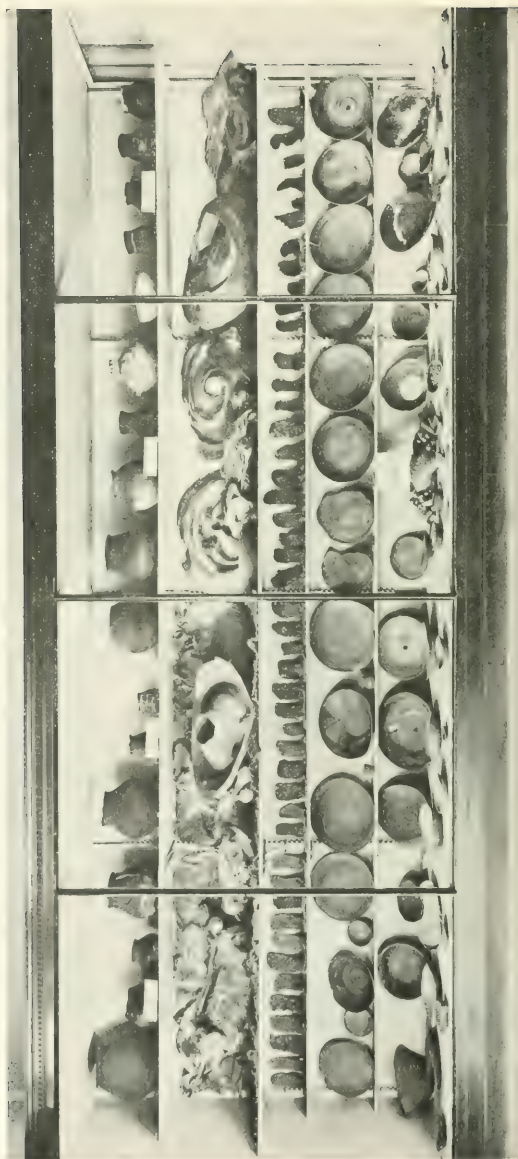
BIRD HALL. NORTH WING, NO. 208

Continuing to the westward, one enters Hall No. 202 of the West Wing. This hall contains the collections illustrating the culture of the Indian tribes of the southwestern part of the United States and of Mexico. The north-eastern portion of the hall is occupied by collections from the Indians of California, tribes particularly interesting on account of their basketry. First come the baskets of the southern and central part of the State. The large wall case beside the entrance contains the larger specimens and also material illustrating the mode of manufacture. The "A" cases contain examples of beautiful weave and design. The Pomo, a tribe living near San Francisco, weave feathers into their baskets; each of the black tufts represents all that is used from a single bird (the Valley Quail). The culture of the Mutsun, the Maidu, the Shasta, the Wintun, the Pit River and the Yurok tribes is shown both by their baskets and by means of their implements of war, hunting and fishing.

Beyond the California exhibit (*i. e.*, towards the west) are the collections showing the cultures of the tribes of Mexico, arranged in the following order: Tepehuane, Tarahumare, Huichol, Cora and Tarasco. It will be noted that the northern tribes, the Tepehuane, the Tarahumare and the Huichol, have been affected less than the southern by Spanish influences.

The region inhabited by the Huichol is comparatively arid, hence most of their religious ceremonies are intended to propitiate the gods of rain, and their ceremonial objects are covered with symbols representing rain. A large series of these objects is on exhibition. Elaborate ceremonies pertain to the pilgrimages after the cactus, from which the drink known as "mescal" is made. These ceremonies are illustrated by many specimens. The Huichol are skilful weavers, and the collection shows many samples of their work. A group shows the methods employed by this tribe in making arrows and cloth.

The other tribes of southern Mexico and Guatemala (see the cases in the northwest corner of the hall) show the survival of pre-Columbian culture in their sacrificial jars, masks and other objects, most of which pertain to ceremonial rites.



CULTURE OF THE BASKET-MAKERS OF SOUTHEASTERN UTAH. A CASE IN HALL NO. 202

The south side of the hall is devoted to the collections showing the culture of the tribes of the pueblos of New Mexico and Arizona and the cliff-dwellings of Colorado and Utah. Some of these peoples are now extinct, others still survive. At the entrance (east) is a large series of the various kinds of pottery from the pueblos. Here too is a Navajo blanket in process of weaving. A neighboring case exhibits, by means of raw and prepared materials, tools and photographs, the methods employed by the Pueblo in making pottery and cloth. The manner of preparing native colors and dyes forms a part of this exhibit. In the next upright case, the Hopi "katchinas," or dolls, and "the trousseau of a bride" give further hints as to the life in the modern pueblos.

The Pueblo
and the
Cliff-
Dwellers.

Pueblo Bonito, a prehistoric ruin in the Chaco Cañon, New Mexico, has furnished through the Hyde Expedition a wonderful array of choice objects. These have been installed in the center of this side of the hall, and include chalcedony and obsidian arrow points; stone implements of many kinds; bone needles, awls, bodkins and chisels; pottery bowls, pitchers and jars; turquoise beads, pendants and figures, to the number of more than fifty thousand; arrows, spears and axes. A series of flutes shows that these ancient people were cultivated in music. Carved sticks were used in some ceremonies in the same pueblo.

Pueblo
Bonito.

Other pueblos and the cliff-dwellings have furnished through the same expedition a wealth of material showing the advanced culture of their prehistoric inhabitants. One case shows all kinds of ancient sandals, and exhibits by means of specimens the mode of manufacture and the manner of wearing. A prehistoric cotton blanket is on exhibition, together with the ancient implements of weaving.

A Guide Leaflet, entitled "The Basket Makers of Southeastern Utah," describes in some detail the unique collection in the large case in the southwestern corner of the hall. This leaflet may be found attached to the case, or the visitor can purchase it from the attendant.

The William Demuth Collection of pipes shows the manner of use of smoking-tobacco in many parts of the world.

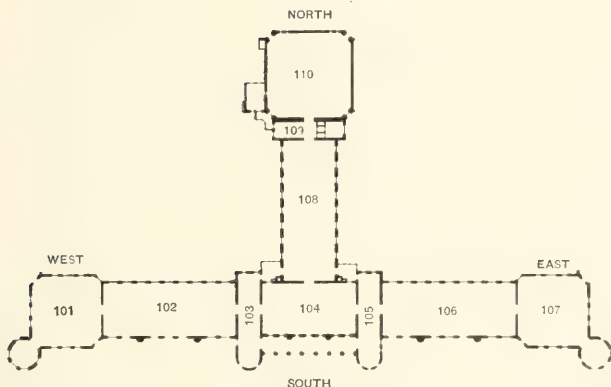
On account of their height, the casts of two stelæ from the ruins of Quirigua, Guatemala, have been installed in this hall instead of in Hall No. 402.

Beyond this hall one passes into the corner hall of the West Wing (No. 201), which contains extensive collections of the antiquities of the central and eastern parts of North America. The specimens are arranged according to the localities where they were found, those from the northern region being on the north side of the hall; from the eastern, on the east side, etc. The antiquities from Manhattan Island and the vicinity of New York City, a model of an Ohio mound and a cache of 4,800 chipped objects from Illinois (probably constituting a prehistoric arsenal) are of special interest. There is an extensive exhibit of the artifacts and human bones which have been found in the terraces along the Delaware River, near Trenton, N. J., in the course of investigations carried on during many years by the Museum. These remains are thought to indicate that man was in existence upon this continent at the close of or during the later stages of the Glacial Epoch. There is a Guide Leaflet to the "Saginaw Valley Collection," which may be borrowed or purchased of the attendant.

In the Tower Room are displayed types of prehistoric implements, forming the Andrew E. Douglass Collection, which was presented to the Museum in 1900.

Going back again to the East Corridor (No. 205), the visitor will descend to the ground floor of the building and there complete his survey of the Museum.

FIRST FLOOR



Turning as before to the east, one enters the first hall of the East Wing (No. 106), which is devoted to the exhibit of North American Forestry. At the entrance of the hall, there has been placed a key-diagram giving the plan of arrangement of the collection, which should be consulted by the student.

The exhibit consists of the Jesup Collection of Trees of North America, which is the most complete collection of the kind in any museum. The specimens are elaborately labeled and are accompanied by water-color sketches of leaves, flowers and fruit. Small maps show the geographical distribution of each species. The general scheme of arrangement is that conifers, chestnuts, oaks etc., are on the north side of the hall, while walnuts, maples, ebony, mahogany etc., are on the south side. The collection was presented to the Museum by its president, Morris K. Jesup, Esq.

For lack of space here, two important wood specimens have been placed in the next hall.



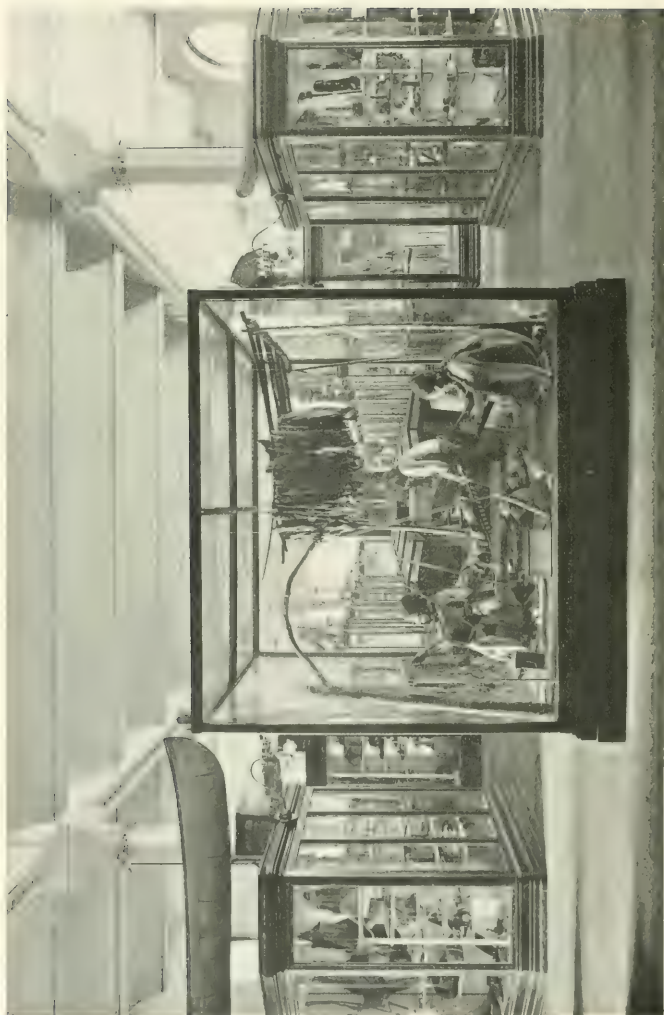
NORTH AMERICAN FORESTRY, HALL NO. 106

Beyond the Wood Hall is the Hall of Invertebrate Zoölogy (No. 107). On the north of the entrance is a section of California redwood, and on the south a section of the Sequoia or "Big Tree," 16 ft. 8 in. in diameter. A Guide Leaflet entitled "The Sequoia" may be borrowed or purchased from the attendant. Big Tree.

The key-diagram at the entrance of the hall enables the visitor to comprehend at a glance the arrangement of the collections. The "alcove" plan has been followed strictly **Invertebrate Zoölogy.** in the disposition of cases around the outer portion of the hall. These alcoves contain the synoptic collection of invertebrates, and by beginning in the northwest corner and going from left to right around the hall one passes from the lowest to the highest forms of animal life. The exhibition of microscopical animals, in Alcove I, will warrant careful examination. The Sponges in Alcove II have exquisite beauty. In Alcove III are excellent models of living coral-forming animals. Special exhibits have been placed in the center of the hall. Among the most interesting specimens are the models of the Giant Squid and Octopus, two large corals, models of the development of *Crepidula* egg, and an exhibit showing the life history of Mosquitoes and their relation to malaria. On the south wall hangs a specimen of the Giant Spider Crab from Japan.

The Tower Room, opening out of this hall, contains a special exhibit of stony corals, largely the gift of Mr. Percy R. Pyne.

The visitor will now retrace his steps through the Wood Hall to the East Corridor (No. 105), where he will find displayed the Jesup Collection of Building Stones. The main portion of this series consists of four-inch cubes duplicating the collection made for the United States National Museum in connection with the Tenth Census. Jesup
Building
Stones. The specimens are arranged geographically according to the States from which they came, and under each head they follow the same grouping, granites and other crystalline rocks, sandstones, limestones and marbles being placed together. The eight-inch cubes on the tops of four of the cases form an exhibit of the various building stones occurring in Georgia.



ETHNOLOGY OF THE NORTHWEST COAST OF AMERICA, HALL NO. 108

From the East Corridor pass to the North Wing (Hall No. 108). The visitor, on entering this hall, should first consult the key-diagram, from the map accompanying which he will note that the hall contains material illustrating the tribes of the northwestern coast of America and the contiguous plateau region. The collections from the coast tribes have been installed in two series:

First. A general or synoptic collection of specimens obtained from the entire area, designed to illustrate the culture of the people as a whole;

Second. Several independent collections, each illustrating the peculiarities of the culture of a single tribe.

The collection forming the first series occupies three alcoves on the north side of the hall. This collection shows:

(a) Natural products that are of economic value: the vegetable kingdom furnishes food and material for manufactures; the multitude of objects made from the cedar, such as blankets, baskets, ropes, boxes, canoes, illustrate the importance of this tree; the animal kingdom provides fish for food, horn for manufacture into spoons, skin for blankets, wool for weaving, shell for ladles, bone for tools, porcupine-quills for purposes of ornament; the mineral kingdom furnishes material for axes, hammers, scrapers and other tools.

(b) The industries of the people, as illustrated by their work in stone: pecked hammers and mortars and polished knives and ornaments; their work in wood,—splitting and planing, bent-work, carving; their weaving,—baskets, mats and clothing; their painting, rope-making and modern metal-work.

(c) House-furnishings,—principally boxes, dishes and baskets,—of which there are several examples in Alcove 2.

(d) Dress and ornament, illustrated by life-sized figures, some of which show the custom of wearing labrets and nose-rings.

(e) Trade and barter,—copper plates used as standards of value, and articles that have been imported from the tribes of the interior, from the Eskimo and indirectly from more distant countries.

(f) Hunting and fishing, bows and arrows, spears, fish-hooks,



DISTRIBUTION OF TIMBER IN THE PACIFIC NORTH-PACIFIC COAST. SEE TABLE NO. 100, 101, 102

One special note: A special delivery person (usually a mail carrier) sometimes leaves a letter.

2. The front entrance (usually) always contains a large mirror.

3. The front hall usually contains a mirror, a coat closet, a small room (usually a bathroom) and a small room (usually a closet).

4. The front hall usually contains a small room (usually a closet).

5. The front hall usually contains a small room (usually a closet).

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On the whole, the special collections are arranged in the same order as the general synoptic collection illustrating the culture of the coast tribes. The collections from the Tlingit of southern Alaska (Alcoves 4, 5, 6) are remarkable particularly on account of the great number of excellent old pieces of superior workmanship. The numerous masks from this region were used by the shamans in their ceremonies and represent their individual protectors.

In the collections from the Tsimshian and Haida of northern British Columbia (Alcoves 6 and 7 and Center Case 20) paintings and models of totem-poles will be found, which illustrate fully the use of the crest and the representation of family traditions on the carvings of these people. Their masks are also used in festivals celebrated by the various families.

The collections from the Bella Coola of central British Columbia (Alcoves 8 and 9 at north end of hall) contain a full set of ceremonial masks illustrating all the important deities of the tribe, chief of which is the Sun.

A very full collection from the Kwakiutl of Vancouver Island is found in Alcoves 9-12. The peculiarities of their industries are illustrated by numerous specimens. Many of the masks (Alcove 11) are used in pantomimic representations of the traditional history of the families; while others, together with neck-rings and head-rings of cedar-bark, belong to the ceremonials of their secret societies, particularly to those of the Cannibal Society (Alcove 12).

Next in order come the collections from the Nootka (Alcoves 12 and 13), whose industries and customs are similar to those of the Kwakiutl. The masks and carvings which they use, however, are much ruder than those of the northern tribes. This is the only tribe that hunts the whale. Their whaling-harpoons are exhibited in Case S at the south end of the hall.

On the south side of Alcove 13 are found collections from the Coast tribes of the State of Washington (Coast Salish). The culture of this region shows a gradual transition to that of the tribes of the interior. Here we find basketry highly developed.

The material in Alcove 14 is so arranged as to bring out as strongly as possible the contrast between the culture of the coast and that of the interior. The cases contain excellent basketry, and garments made of skin decorated with painted geometrical designs and with pictographic representations. Here we also find specimens illustrating the use of the horse. The clothing exhibited in Alcove 15 shows the close affiliations of this culture with that of the Plains Indians. The garments are made of skin decorated with feathers, painted and embroidered. The similarity of culture with the eastern Indians is still greater among the Plateau tribes near the Columbia River (Alcove 16). Here we notice painted hide bags, embroidered blankets and bead-work quite similar to that of the eastern Indians. The tribes of this district also excel in basketry similar in type to that of the interior of British Columbia.

The contrast between the occupations and the dress of the coast tribes and those of the interior is brought out in three groups in the middle of the hall.

The desk cases along the center of the hall contain archaeological collections. The southern cases exhibit material from the plateau region, while the northern cases contain material from the coast region. It seems that, on the whole, the culture of the prehistoric tribes has been the same as that of the present tribes.

Most of the material in this hall was obtained by the Jesup North Pacific Expedition.

From the north end of Hall No. 108 one passes through the North Corridor (No. 109) into the Lecture Hall (main floor). This is the center of great activity during the fall, winter and spring months. Regular courses of lectures are given on Thursday evenings by members of the scientific staff to Members of the Museum, on Saturday mornings to the teachers in the public schools (in co-operation with the State Department of Public Instruction), on Tuesday and Saturday evenings to the general public (in co-operation with the City Board of Education), and on other occasions as need arises. About ninety lectures are delivered in the course of the season.

The hall is 100 feet square and can seat an audience of 1,500 people. It is provided with two screens, each 25 feet square, and the illustrations for the lectures are projected by means of two double electric stereopticons.

Leaving Hall No. 108 at the south end we pass to the West Corridor (No. 103). Here, extending upward through three stories of the building, is a Haida totem-pole, 52 feet tall, from Queen Charlotte Island.

Continuing toward the west, North American Hall (Hall No. 102) is entered next. The collections in the south side of this North American Hall represent in sequence the cultures of the Indians of the Plains, of the Eastern Woodlands and of part of the Southwest. The visitor is recommended to begin here in continuation of the studies which he has made in the North Wing (No. 108).

The collections from the Plains Indians have largely been made from the point of view of illustrating their decorative art and their ceremonials. The first case on the south side (Case 17) contains material from the Blackfoot. This is followed by collections from the Cheyenne (Case 18), Arapaho (Cases 18-21), Gros Ventre (Cases 21, 22), Sioux (Cases 23-26), Shoshone (Cases 27-28), and Ute (Case 29),—all representatives of the Plains culture.

These tribes originally subsisted on the buffalo, and consequently most of their utensils pertain to the preparation of skins and to the manufacture of implements of bone (Case 19). The present ceremonials of the Plains tribes are much modified by the teachings of recent Indian prophets, which have taken the form of the so-called "Ghost dance," the paraphernalia of which are exhibited in Cases 19 and 20. Bags containing certain sacred objects are much used. Such a sacred bag is in a case in the center of the hall. Among many tribes there exist societies grouped according to ages, which perform ceremonial dances, each with separate paraphernalia; the objects pertaining to four such dances are shown in the wall-case, south side of hall.

The significance of the peculiar geometrical ornamentation employed by the Plains Indians is illustrated (Case 20) as found among the Arapaho. The Gros Ventre (Cases 21, 22) are closely related to the Arapaho. In the collection from the Sioux, a number of war-clubs and bows and arrows will be found (Case 23). Saddles, quirts and saddle-bags illustrate the extended use of the horse, which has so much influenced the life of the Plains Indians since its introduction. The "horse travois" in Case 23 shows a means of transportation. The pictographic symbolism and the decorative art of the Sioux are illustrated by many shields and garments. The industries and decorative art of the Shoshone and of the closely related tribes of the Bannock and Ute are exhibited in Cases 27-29.

The great ceremonial known as the Sun dance, which is so characteristic of many of the Plains tribes, is illustrated by a group in the center of the hall.

The culture of the Indians of the Eastern Woodlands is shown in Cases 29-31. The life of these tribes has been very much influenced by contact with the whites; but in a few districts some of the old industries still survive. **Indians of the Eastern Woodlands.** The pouches (Case 28) and the mats (Case 29) from the Sauk and Fox probably represent the ancient type of ornamentation of this district. These Indians practise agriculture, and in some regions live on wild rice. Agricultural tools and products are shown in Cases 30 and 31.

Adjoining these people to the north live the Athapaskan of the Mackenzie area, who subsist on hunting and fishing, and whose present industries have been highly modified through contact with the Hudson Bay Company (Case 33).

The Indians of part of the Southwest are illustrated in the long wall-case on the south side of the hall by a collection of basketry of tribes in Arizona: the Apache, Pima and Papago.

The visitor is advised to return now to the east end of the hall, and to begin an inspection of the collections in the northern half. These represent the cultures of the Eskimo tribes from Greenland to Siberia and those of the Ainu and some of the tribes dwelling along the Amur River.



ESKIMO WOMAN, WEST COAST OF HUDSON BAY. HALL NO. 102

The wall-case at the entrance and Cases 1 and 2 contain a comparative series illustrating the uniformity of the cultures of the Eskimo of the whole area, extending even to the Chukchee of northeastern Siberia.

The collections from Smith Sound (Cases 1 and 3) show that the objects made by the tribe of Eskimo living here are very rude in form. Along the west coast of Baffin Bay a greater variety of objects and tools is used (Cases 3 and 4), partly owing to the greater abundance of drift-wood. The natives of this region use whaling-lances (Case 4), and have ceremonials in which masks are used.

The Eskimo of Southampton Island have had very little contact with Europeans; consequently we find here (Case 5) stone-tipped arrows and harpoons, toboggans made of whalebone, implements for chipping stone, and other very primitive objects. Wherever steatite, or soapstone, occurs, the Eskimo make lamps and pots out of it, but in the limestone area of Southampton Island, in Hudson Bay, where no steatite is available, lamps and pots are made by cementing together slabs of limestone (Case 4).

The tools and implements of the Eskimo of the west coast of Hudson Bay (Cases 5, 6, 7) are more varied, partly because musk-ox horn and a rather plentiful supply of wood are available for manufactures, partly on account of the influence of the neighboring Indian tribes.

There is a decided change in the type of culture west of Mackenzie River. The implements of the Eskimo of this area, which includes Alaska, are much more complex than those of the other tribes, and there is a strong tendency to decoration which is absent among the eastern Eskimo. We find here highly differentiated forms of harpoons (Case 7), ivory objects with pictographic representations (Case 8), stone implements and stone ornaments of varying form, and harpoons with property-marks (Case 9), coiled and woven basketry and a great variety of masks (Case 10). The culture of the Eskimo of Siberia (Case 11) is practically identical with that of the Eskimo of Alaska.

The remainder of the hall is taken up with collections from southeastern Siberia.

Cases 12 and 13 contain material from the Ainu of Yezo and Saghalin. Many of the objects exhibited in these cases show a strong influence of Japanese culture, while others show that the culture of the Ainu resembles that of other Siberian tribes. We find here simple basketry, clothing woven of nettle-fibre, carved wooden dishes and many objects used in ceremonials connected with the bear-hunt. The Ainu.

The tribes of the Amur River region (Cases 13-16) are highly influenced by their neighbors the Chinese. They live principally on salmon, and their garments are largely made of salmon-skins, but elk-hide is also used (Cases 13-15). More recently garments with silk embroidery and appliqué-work have been used. The characteristics of their patterns are scrolls, which are worked out in the forms of roosters and fishes (see particularly turn-stand on wall on north side of hall). Similar work is done in wood-carving and birch-bark (Case 16). Among these tribes the bear-hunt is connected with many ceremonials in connection with which beautiful inlaid lances are used (Case 16). In the treatment of the sick, crude carved amulets representing the spirits of diseases are used (Case 16). Their canoes, which are partly covered on top, have long ends projecting under the water (case in middle of hall). Models of the houses, sledges and boats of the Amur tribes are exhibited in the wall-case at the west end of the hall. Tribes of
the Amur
River.

Leaving the North American Hall at the western end, the visitor finds himself in Hall 101 of the West Wing. This hall is filled with the Siberian collections obtained by the Jesup North Pacific Expedition. These form the most complete exhibit of the culture of that region in existence. The Siberian Hall.

The tribes represented in the hall are, beginning at the right of the entrance (consult also the map on page 42):

The CHUKCHEE (Coast of Bering Sea and inland), Cases 1-5;

The KORYAK (Coast of Bering Sea and inland), Cases 6-9;

The KAMCHADAL (Peninsula of Kamchatka), Case 9;

The YUKAGHIR (Basin of Kolyma River), Cases 10, 11;

The TUNGUS (Coast of Sea of Okhotsk), Cases 12-15;

The YAKUT (Basin of the Lena River), Cases 15-18.

One section of the Chukchee and Koryak inhabits maritime villages and subsists by hunting sea-mammals, while another section of the tribes dwells in the interior and lives upon the produce of reindeer-breeding. The customs of these two divisions of the tribes are very much alike.

The clothing worn by the Chukchee is illustrated in Case 1, beside the entrance. The skins of reindeer and of seals are used for both winter and summer garments. Household utensils, such as stone lamps, kettles and spoons, and implements for various industries, such as skin-dressing and work in bone and wood are shown in Case 2. Snowshoes and snow-sticks indicate the mode of travel.

Harness and other articles (Cases 2 and 3) show the use of dogs and reindeer as draught-animals. On the west side of Case 3 are objects used in hunting the whale and other sea-mammals. Case 4 contains bows and arrows and suits of armor. The armor evidently was made in imitation of that of the Japanese. Amulets and sacred fire-drills are used in the ceremonials of the Chukchee. The adjoining "A" cases contain pictographic representations (many of which are used in prayers), wooden and ivory carvings, ornaments and pipes.

Models of various types of sledges of the Koryak and Chukchee are exhibited in Case 5.

The clothing of the Koryak (Case 6) is much more elaborately decorated than that of the Chukchee. The decoration is partly in embroidery, partly in skin mosaics. Their pictographic representations and their carvings in bone, ivory and horn are shown in the adjoining "A" cases.

The Koryak are the only tribe of eastern Siberia possessing a well-developed iron industry. Tools and manufactured objects of iron will be found in Case 7, in which there are also objects of pottery quite similar in type to that of Alaska. Among the Koryak industries, basketry deserves particular mention (Case 7). Their weapons and the style of their armor are quite similar to those of the Chukchee (Case 8). In their festivals, many of



CHUKCHEE MAN, EASTERN SIBERIA. HALL NO. 101

which pertain to the hunt of the whale, elaborately decorated garments are worn, and masks made of grass and of wood are used (Case 8). On the north side of Case 9 are shown garments in which the body of a dead person is dressed when it is placed on the pyre to be burned.

The south side of Case 9 contains basketry and birch-bark objects from the Kamchadal, a collection of particular value because the primitive culture of this Kamchatka tribe is practically extinct. The Kamchadal.

The Yukaghir live farther to the west. Specimens from the tribe are contained in Cases 10 and 11 and in the small case near by. The Yukaghir have hardly any reindeer, and subsist on fish; consequently they are poor, and the objects used by them are much simpler than those found among the Koryak. Attention is called to the peculiar shaman's drums and the shaman's coat set with numerous tassels (Case 10). Case 11 contains a model of a Yukaghir tent, and models of boats and fish-traps. There are also birch-bark baskets for household use and for berrying and snowshoes for travelling. The "A" case near by contains objects illustrating their industries, and a series of peculiar pictographic birch-bark records, which are characteristic of this tribe. The Yukaghir.

The Tungus (Cases 12-15) are a tribe which have recently scattered over extensive areas in eastern Siberia. Their cradles (Case 12) and their garments (Cases 13, 14) are quite different in type from those of the more eastern tribes. The Tungus. Their shamans use drums, and they wear coats set with iron ornaments (Case 14). The people use reindeer for riding. Saddles will be found in Case 15. Household furniture, bows and arrows and snowshoes are exhibited in the same case.

The culture of the Yakut, a tribe belonging to the Turkish family, is shown by the specimens in Cases 15 to 18. Until quite recently the religion of the tribe was shamanism. The drums and dresses used by their shamans (Case 15) are similar to those of the Tungus. The Yakut. Hunting and fishing and household life are illustrated by specimens in Case 16. The every-day clothing and the more elaborate dresses of the wealthy Yakut are exhibited in Case 17. The "A" case near by contains silver

ornaments used by this people. Case 18, beside the entrance, contains material illustrating the use of the horse among the Yakut. An important part of the subsistence of the tribe is mare's milk, which is made into kumiss and into butter in large leather churns. Kumiss is also used in ceremonials, when it is served in large carved goblets. Butter-jars and large milk-pails are made of birch-bark. The Yakut canoe (top of Case 17) is similar in type to that of the Amur tribes exhibited in Hall 102.

THE AMERICAN MUSEUM JOURNAL

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Guide Leaflets.

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- No. 2. **THE SAGINAW VALLEY COLLECTION.** By HARLAN I. SMITH, Assistant Curator of Archæology. December, 1901.
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- No. 11. **THE MUSICAL INSTRUMENTS OF THE INCAS.** By CHARLES W. MEAD, Assistant in Archæology. July, 1903.
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- No. 13. **A GENERAL GUIDE TO THE AMERICAN MUSEUM OF NATURAL HISTORY.** January, 1904.



THE HOME OF A CHUKCHEE FAMILY, EASTERN SIBERIA

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THE Supplement accompanying this number of the JOURNAL consists of a Guide-Leaflet upon "Birds' Nests and Eggs," which has been prepared by Mr. Frank M. Chapman, Associate Curator of the Department of Mammalogy and Ornithology. After a general discussion of the subject, based largely upon the material in the Museum which is exhibited in the form of groups, the author gives a complete list of the birds known to breed within fifty miles of New York City, with notes upon their nesting habits. This guide-leaflet will be found of value to all students of birds and bird-life, but it will be of especial use to persons interested in local ornithology.

THE HOUSE-LIFE OF THE CHUKCHEE OF SIBERIA.

THE ordinary Chukchee house consists of a large circular skin tent, with a square inner room, also of skins, placed at the back of the tent and opposite the entrance. In winter the inner room forms the living-room and is carefully protected against the cold.

Little furniture is used, the people sitting about on skins and brush mats laid flat on the ground. Occasionally a table is seen, which is simply a board raised two or three inches above the ground.

The most important articles in a Chukchee house are the lamps. These are usually of clay or sandstone, hollowed out with an adze. In the center is a bridge with a cleft reaching nearly to the bottom. The lighting-material is blubber from sea-animals or tallow tried out from reindeer-bones. The latter is much preferred, as it burns with a clear, soft light and with little smoke. Wicks are made of moss, thoroughly dried, and spread in a thin layer across the front edge of the lamp. The

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fuel is placed behind the bridge, and the oil runs through the cleft and around the edges to the base of the wick. The entire lamp is placed in a tray to catch the drippings.

When fire other than that of the lamps is used, it is built in the outer tent between the inner room and the door.

Cooking is almost always done by boiling in kettles. Formerly these were of clay, but now they are made of copper or iron obtained from traders. Hooks of wood and antler are used to suspend the kettles over the fire.

One of the most important sets of kitchen implements is that for crushing bones to extract marrow and oil. The same implements are used for crushing frozen meat, fish and blubber. The set consists of stone mauls and accessories, as shown in the collection.

Trays, dishes, bowls, dippers, etc., usually are made of wood. Spoons, which were formerly unknown, now are made of wood, horn, bone or ivory, or even of metal rudely bent into shape. Ladles of reindeer antler are used for dipping meat from the kettles. At present much cheap metal ware and crockery is obtained from traders. When broken, these utensils are cleverly mended by the natives. A Chukchee traveler always carries with him his own teacup and saucer in a closely-fitting wooden case.

The principal food of the people is the flesh of reindeer and sea-animals, the latter being especially relished on account of the fat. Blood is also much eaten, either fresh, mixed with herbs or dried meat, or preserved in bags. It is frozen in winter and fermented in summer. A gruel made of moss is much liked, as well as many varieties of edible roots.

Of drinks, tea is the most important, and its use has spread everywhere. Chinese or Japanese brick-tea is the common form in which it is obtained from traders. Practically the only native intoxicant is fly agaric (*Agaricus muscarius*), which is dried and eaten, producing an intoxication much like that of hashish. Alcohol is indulged in whenever it can be obtained from merchants or whalers.

Tobacco is smoked and chewed, whenever obtainable.

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The Chukchee are fond of games and contests of all sorts. Wrestling and various ball-games are well-known amusements of the elders. Among children the favorite toys are dolls and tops.

Specimens of the objects used in the sports and by the children are shown in the collection which is on exhibition in the Siberian Hall (Hall No. 101).

THE STORER COLLECTION OF SHELLS.



THE Department of Conchology has received as a gift from Mr. Albert H. Storer of this city the valuable collection of shells which was made by his father. The elder Mr. Storer through his connections with shipping interests had many opportunities of obtaining shells from the sailors and captains of ships, in the days when some handsome species were more common than they are now. The Storer Collection comprises about 3,500 specimens. Its importance to the Museum lies in the representation of the more showy genera, such as *Cypræa*, *Voluta*, *Melo*, *Cymbium*, *Conus*, *Harpa*, *Mitra*, *Oliva*, *Strombus*, *Scalaria*, *Murex*, *Turbo* and *Phasianella*. The examples of these and other genera, on account of their individual variation or perfection, will prove to be attractive additions to the exhibition series. The marine forms greatly predominate over the land shells, as might be expected from the manner in which the collection was made.

DURING February and March there was on view at the Museum the model of the Syrian Protestant College at Beirût, Syria, which the Rev. D. Stuart Dodge, D.D., has had made for the exhibit of Christian Missions at the Louisiana Purchase Exposition, at St. Louis. The model is on a scale of one-sixteenth of an inch to the foot and gives an excellent idea of this educational institution, which is one of the most influential on the shores of the Mediterranean.

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ORBICULAR GRANITE FROM MICHIGAN.



TWO-THOUSAND pound mass of the rare kind of granite known as Orbicular, or Spheroidal, Granite was placed on exhibition in the Hall of Geology in February. This kind of granite, which is an igneous rock, results from the peculiar conditions that obtained while the original mass was cooling from a state of fusion. Substances of similar chemical composition tend to separate out from such a cooling mass and to form more or less rounded, concretionary balls, which lie in a matrix formed of the remainder of the magma. The resulting rock looks like a conglomerate, or "pudding-stone," but is entirely different in character. Conglomerate is a sedimentary rock, and the rounded masses in it are pebbles which have been ground into shape by the action of water, and which are now in a matrix of similar origin. Orbicular granites and diorites, another kind of igneous rock, have been found in New Hampshire, Rhode Island, Scandinavia, Finland, Corsica, Ireland and elsewhere. The block now under consideration is a boulder which was found near Charlevoix, Michigan. Its original source is not known, but the boulder must have been brought by the ice of the Glacial Epoch from some ledge to the north, probably in Canada.

THOSE who have been following the announcements of discoveries regarding radium and the radio-activity of elements and minerals will examine with interest the special exhibit of about seventy species and varieties of minerals which has been assembled by the Department of Mineralogy, for the purpose of showing the substances containing more or less of the element uranium. All these minerals have been stated to show radio activity or to be responsive to radio-active substances.

NOTEWORTHY additions to the mineral collection are three groups of twinned crystals of calcite from Joplin, Mo. The material is amethystine in color, and the crystals are remarkable for size and clearness. One crystal is fourteen inches across.

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THE COLLECTION OF FOSSIL FISHES.



THE JOHN STRONG NEWBERRY Collection of fossil fishes has been added to the important series already at the Museum. This is probably the most important assemblage of American species which is in existence. It is very large, its catalogue including about six thousand entries, and it contains many of the type specimens described and figured in Professor Newberry's monographs on the Paleozoic Fishes of North America and the Triassic Fishes of New Jersey and the Connecticut Valley. The new acquisition comes as a deposit through an agreement with the trustees of Columbia University.

Among the collections of such fossils previously in the possession of the Museum may be mentioned the Triassic forms from Sunderland, Mass., part of which were obtained with the James Hall Collection and the remainder as the gift of the late Mr. Robert L. Stuart; the specimens from the Eocene Tertiary beds at Twin Creeks, Wyoming, the gift of the late Mr. J. M. Constable; the Jay Terrell Collection from the Devonian rocks of Ohio, presented by the late Mr. William E. Dodge; the extensive series obtained with the Cope Collection and embracing forms from the Devonian of Pennsylvania, the Permian of Texas, the Carboniferous of Illinois and Ohio and especially from the Green River shales (Tertiary) of the Rocky Mountain region; and the collection of Cretaceous fishes from Mt. Lebanon, Syria, which were obtained for the Museum by Mr. Morris K. Jesup from the Syrian Protestant College at Beirut.

This expansion of the collection of fossil fishes has made it necessary to provide an exhibition hall for its proper display. Consequently the Tower Room opening from the Hall of Fossil Reptiles (Hall No. 407) has been set aside for this section of the Department of Vertebrate Paleontology, and the work of preparation and installation has been begun under the direction of Professor Bashford Dean, one of Professor Newberry's pupils, who has been appointed Honorary Curator of Fossil Fishes. For purposes of ready comparison recent forms will be exhibited

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beside related fossil forms, and special synoptic exhibits will illustrate the structure and evolution of the most important groups.

MODEL OF THE FOUR-TOED HORSE.



THE Department of Vertebrate Palæontology has just added to its series of models of fossil mammals on exhibition in Hall No. 406 a life-sized model of the little Four-toed Horse (*Protorohippus*), the earliest known ancestor of the modern horses, asses and zebras. These models have been prepared under the direction of Professor Osborn by Mr. Charles R. Knight, and have been presented to the Museum by J. Pierpont Morgan, Esq. The present model is based upon exhaustive studies by Professor Osborn and Mr. Gidley of the skeleton of the Four-Toed Horse and other rare specimens belonging to the Museum. It forms a most interesting and instructive addition to the exhibit in the Horse Alcove of the Hall of Fossil Mammals. Although *Protorohippus* was remarkably different from the modern Horse in the proportions of body and limbs, in the number of toes, the length of the head, and in many other important characteristics, the artist has contrived to impress upon the restoration those details of character and pose which stamp it unmistakably as an ancestral horse, and which are warranted by the results of the study given to the skeleton, and by the long line of intermediate stages leading up into the modern Horse which have been found in the successive formations of the western Badlands.

The animal, as is indicated by the skeleton, was less than thirteen inches high at the shoulder, or about the size of a fox-terrier. The modern draught horse, the skeleton of which is exhibited in the same alcove, is 65 inches high at the shoulder, and its skull alone is larger than the entire body of its little four-toed ancestor. The limbs, and especially the feet, of the model, are much shorter in proportion and the toes, four on the fore-foot and three on the hind-foot, are very different from those of the modern horse. These features, considered in connection with the elon-

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gated body and rounded back, suggest the dog more than any other familiar animal. The head shows much more horse character, yet its small size in comparison with the body, the short face, and the very forward position of the eyes are striking characters in which it differs from its modern descendant.

NEWS NOTES.

THE co-operation of the Museum with the public schools of the city has been greatly extended during the past few months. One of the features of this co-operation has been the preparation and distribution of "circulating collections" in each of several branches of natural science. These collections represent the most common species among (1.) Native Birds, (2.) Mollusks, (3.) Echinoderms and Worms, (4.) Insects, (5.) Crustaceans, (6.) Sponges and Corals and (7.) Minerals and Rocks. The sets are accompanied by brief explanatory notes prepared by the Curators for the assistance of the teachers of the nature-study classes. These collections are in great demand for work among the classes of the first four grades. They are loaned upon certain conditions which may be learned upon application to the Director. A more detailed account of this work may be expected in a later issue of the JOURNAL.

IN the higher grades of the schools the study of geography and history takes the place of the nature-study work of the lower grades, and in order to assist the teachers of these classes illustrated lectures have been given in the Assembly Room of the Museum to many groups of pupils accompanied by their teachers. For the most part these lectures, or talks, thus far have been upon the industries of the United States. The subjects are determined by the needs of the teachers applying for the assistance and by the lantern-slides which are available at the Museum. Out of this work have grown requests for addresses to larger bodies of pupils. One such request came from Public Schools Nos. 33 and 56, with the result that on March 8, Dr. Clark Wissler, Assistant Curator of Ethnology, lectured on the Indians of North America to 1087 pupils from these two schools alone.

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IN February one of the daily newspapers of the city instituted a prize contest among the children of the public schools for essays upon the museums, parks and other features of the city. This Museum joined heartily in that enterprise by means of lectures offered to the school children who might be competing for the prizes or who might for other reasons be interested especially in the topics proposed. The programme of lectures was as follows:

March 4.—"The American Museum of Natural History," by Mr. HARLAN I. SMITH.

March 11.—"The Parks of New York City," by Mr. L. P. GRATACAP.

March 18.—"What New York has Done for the Children," by Mr. W. H. TOLMAN.

March 25.—"Points of Historic Interest in New York City," by Professor ALBERT S. BICKMORE.

So great was the interest manifested in this plan that the response to the first invitation, which was general, brought more than 5,700 school children to the Museum on the afternoon of March 4, most of whom had note books with them for the purpose of carrying away what information might be obtained. Less than one-third of the number could be accommodated in the lecture halls of the building, so that it was necessary to repeat the lecture by Mr. Smith on Tuesday, March 15. Admittance to the later lectures was by ticket, obtained on application. The crowd that could not gain entrance to the hall on the first day was divided into squads, which were addressed in the exhibition halls by several members of the scientific staff of the Museum. More than 14,000 school children, accompanied by their teachers, attended the special lectures or studied the collections at the Museum between January 15 and March 15 of the present year.

THE Department of Mammalogy and Ornithology has recently received a considerable number of important additions. These include specimens for mounting of the Mountain Caribou and Mountain Goat from the Selkirk Mountains of British Columbia, presented by Messrs. Madison Grant and C. A. Moore; a large series of Mule Deer, and many small mammals, from Lower Cali-

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fornia, collected for the Museum by Mr. Batty; and a fine specimen of the Siberian Elk, obtained by purchase, and the first known to have been brought to this country.

THE Andrew J. Stone Alaska Expedition of 1903 was notably successful, and the collections arrived at the Museum in excellent condition. They include, besides a large series of the small mammals and birds of the Alaska and Kenai Peninsulas, twelve specimens of the great Alaska Brown Bear, taken on the Alaska Peninsula; a fine series of White Sheep, and a number of exceptionally fine specimens of the Alaska Moose, from the Kenai Peninsula. As the Sheep and Moose were killed late in the fall, they are in fine condition for mounting. They complete our material for groups of these large and striking animals.

AT the time of Mr. Stone's lecture, February 25, in the Member's Course, an exhibit was made in Hall No. 206 of some of the remarkable skins which he has obtained for the Museum on his extended travels in Alaska and Arctic America. The skin of one Kodiak Bear is eleven feet long.

MR. HENRY HALES, of Ridgewood, N. J., has presented to the Museum, for its collection of Auduboniana, a specimen of the common Woodchuck mounted by John J. Audubon. It was given by Mr. Audubon to a Mrs. Dunlap, a friend and next-door neighbor of his at Washington Heights, who in May, 1865, gave it to Mr. Hales, in whose possession the specimen has remained until the present time. The history of the specimen is thus beyond question.

THE background for the group of San Joaquin Valley birds has been received. It depicts a broad flat valley, formerly a desert, but now transformed by irrigation into a region of wonderful fertility, behind which rise the mountains of the Coast Range. The purple haze characteristic of arid districts rests upon the distant view. This pictorial background, the work of a California artist, Mr. Charles J. Hittell, will be merged into the foreground of the case, which will consist of a group representing the rich

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bird-life which has been developed since irrigation changed the valley into an attractive feeding ground. The birds of the group will comprise Stilts, Avocets, Cinnamon Teal, Coots, all breeding or with young, Forster's and Black Terns, Pintail and Redhead Ducks, Great Blue Heron and Yellow-headed and California Red-winged Blackbirds.

THREE new bird groups have been placed in Hall No. 304. They represent the Yellow-billed Magpie, a species which is restricted to California in occurrence and which is rapidly decreasing in numbers; the Sierra Sooty Grouse; and the California Valley Quail. The last-named group, with its poppies, is an especially characteristic bit of California bottom-land.

THE large collection of North American Diptera (Flies) which was presented to the Museum recently by Professor William M. Wheeler, Curator of Invertebrate Zoölogy, has been combined with the collection formerly the property of the Museum and is ready for use by students and other interested persons. The whole series is in the office of the Curator of Entomology.

THE series of models representing invertebrate animals (Hall No. 107) have been enriched by many life-like reproductions in glass, wax and other materials of Hydroids, Nemerteans and Planarians.

MR. ARCHIBALD ROGERS, a member of the Board of Trustees, has presented to the Museum an exceptionally perfect copy of the rare and valuable work, the elephant folio, or first edition, of Audubon's "Birds of the United States of America." It is believed that not more than 175 copies of this edition of "Audubon" are now in existence, of which about one-half are thought to be in this country. Published in 87 parts at ten dollars each, the work is now valued at \$3,000, and although some seventy years have elapsed since its appearance, it remains an authority on the life-histories of the birds treated, while the magnitude of the undertaking is an evidence of Audubon's unrivaled energy and courage.

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THE Pine Snake Group, temporarily installed in Hall No. 206, is an excellent example of the modeling and mounting of snakes in their natural surroundings, and, furthermore, well illustrates the protective coloration or marking of animals. Much valuable material in the line of snakes and reptiles has been received from the Zoölogical Park and is being prepared for exhibition or study.

LECTURES.

PUBLIC-SCHOOL COURSE.

THE Tuesday and Saturday evening illustrated lectures to the general public are provided for through co-operation with the City Board of Education. The programme of these lectures from January to April has been as follows:

January 5.—Mr. ISAAC F. SMITH, "Literary and Historic Shrines of Boston and Vicinity."

January 9.—Prof. E. R. VON NARDROFF, "Energy as a Source of Heat."

January 12.—Mr. AUSTEN T. KEMPTON, "Evangeline, Land and Poem."

January 16.—Prof. E. R. VON NARDROFF, "The Expansive Force of Heat."

January 19.—Mr. JOHN JAY LEWIS, "The History and Beauty of Old New England."

January 23.—Prof. E. R. VON NARDROFF, "The Conduction and Convection of Heat."

January 26.—Mr. JOHN HUTCHISON, "Niagara and the St. Lawrence."

January 30.—Prof. E. R. VON NARDROFF, "The Three Forms of Matter in Relation to Heat."

February 2.—Mr. WILLIAM L. MASON, "Up the Hudson and Mohawk to Niagara Falls."

February 6.—Prof. E. R. VON NARDROFF, "The Spheroidal State."

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February 9.—Mr. GEORGE F. GREENE, "The Development of New York City."

February 13.—Prof. E. R. VON NARDROFF, "Heat in the Form of Waves."

February 16.—Mr. HERBERT L. BRIDGMAN, "The Louisiana Purchase and the St. Louis Exposition."

February 20.—Prof. E. R. VON NARDROFF, "Liquid Air, or the Phenomena of Extreme Cold."

February 23.—Mr. GEORGE H. PAYSON, "The City of Washington."

February 27.—Prof. E. R. VON NARDROFF, "Heat as a Source of Energy."

March 1.—Mr. BERNARD M. SHERIDAN, "In the Wake of the 'Half-Moon.'"

March 5.—Prof. HENRY E. CRAMPTON, "Life and Living Matter."

March 8.—Mr. CYRUS C. ADAMS, "Geographic Influences in the Development of the United States."

March 12.—Prof. HENRY E. CRAMPTON, "The Living Organism."

March 15.—Mr. FREDERICK I. MONSEN, "The Monuments of a Prehistoric Race."

March 19.—Prof. HENRY E. CRAMPTON, "The Simplest Animals."

March 22.—Mr. JOHN E. STUCHELL, "In Greater Yosemite."

March 26.—Prof. HENRY E. CRAMPTON, "The Jointed Animals (Worms and their Relatives)."

March 29.—Mr. EDWARD P. CLARKE, "Unique Utah."

April 2.—Prof. HENRY E. CRAMPTON, "The Jointed Animals (Insects, etc.)."

April 5.—Mr. GILBERT McCLURG, "Pike's Peak, Pass and Plain."

April 9.—Prof. HENRY E. CRAMPTON, "Star-fishes and Their Relatives; Molluscs."

April 12.—Dr. LEO S. ROWE, "The Cities of Mexico."

April 16.—Prof. HENRY E. CRAMPTON, "The Lower Back-boned Animals."

THE AMERICAN MUSEUM JOURNAL

April 19.—Mr. LUTHER F. MCKINNEY, "The Republic of Colombia and the Panama Canal."

April 23.—Prof. HENRY E. CRAMPTON, "The Higher Back-boned Animals."

MEETINGS OF SOCIETIES.

THE meetings of the New York Academy of Sciences in April and May will be held in accordance with the following programme. The papers to be delivered on each evening may be learned on application at the Museum, or to the Secretary of the New York Academy of Sciences, Columbia University.

April 4.—Business meeting and Section of Astronomy, Physics and Chemistry.

April 11.—Section of Biology.

April 18.—Section of Geology and Mineralogy.

April 25.—Section of Anthropology and Psychology.

May 2.—Business meeting and Section of Astronomy, Physics and Chemistry.

May 9.—Section of Biology.

May 16.—Section of Geology and Mineralogy.

May 23.—Section of Anthropology and Psychology.

All these meetings are held in the Museum and the public is invited to attend them.

THE Linnaean Society holds its regular meetings at the Museum on the second and fourth Tuesdays of each month, while the Entomological Society meets on the first and third Tuesdays.

Guide Leaflets.

Issued as supplements to THE AMERICAN MUSEUM JOURNAL.
For Sale at the Museum.

- No. 1. **THE BIRD ROCK GROUP.** By FRANK M. CHAPMAN, Associate Curator of Mammalogy and Ornithology. October, 1901.
- No. 2. **THE SAGINAW VALLEY COLLECTION.** By HARLAN I. SMITH, Assistant Curator of Archaeology. December, 1901.
- No. 3. **THE HALL OF FOSSIL VERTEBRATES.** By W. D. MATTHEW, Ph.D., Assistant Curator of Vertebrate Paleontology. January, 1902.
- No. 4. **THE COLLECTION OF MINERALS.** By LOUIS P. GRATACAP, A.M., Curator of Mineralogy. February, 1902.
- No. 5. **NORTH AMERICAN RUMINANTS.** By J. A. ALLEN, Ph.D., Curator of Mammalogy and Ornithology. March, 1902. *Revised edition, Feb., 1904.*
- No. 6. **THE ANCIENT BASKET MAKERS OF SOUTHEASTERN UTAH.** By GEORGE H. PEPPER, Assistant in the Department of Anthropology. April, 1902.
- No. 7. **THE BUTTERFLIES OF THE VICINITY OF NEW YORK CITY.** By WILLIAM BEUTENMÜLLER, Curator of Entomology. May, 1902.
- No. 8. **THE SEQUOIA.** A Historical Review of Biological Science. By GEORGE H. SHERWOOD, A.M., Assistant Curator. November, 1902.
- No. 9. **THE EVOLUTION OF THE HORSE.** By W. D. MATTHEW, Ph.D., Associate Curator of Vertebrate Paleontology. January, 1903.
- No. 10. **THE HAWK-MOTHS OF THE VICINITY OF NEW YORK CITY.** By WILLIAM BEUTENMÜLLER, Curator of Entomology. February, 1903.
- No. 11. **THE MUSICAL INSTRUMENTS OF THE INCAS.** By CHARLES W. MEAD, Assistant in Archaeology. July, 1903.
- No. 12. **THE COLLECTION OF FOSSIL VERTEBRATES.** By W. D. MATTHEW, Ph.D., Associate Curator of Vertebrate Paleontology. October, 1903.
- No. 13. **A GENERAL GUIDE TO THE AMERICAN MUSEUM OF NATURAL HISTORY.** January, 1904.
- No. 14. **BIRDS' NESTS AND EGGS.** By FRANK M. CHAPMAN, Associate Curator of Mammalogy and Ornithology. April, 1904.





DUCK HAWK
Group, Hall No. 24

1-10-1910

Birds' Nests and Eggs,

With an Annotated List of the Birds Known
to Breed within Fifty Miles of
New York City.

A Guide Leaflet to the Collection
in the
American Museum of Natural History.

By

FRANK M. CHAPMAN,

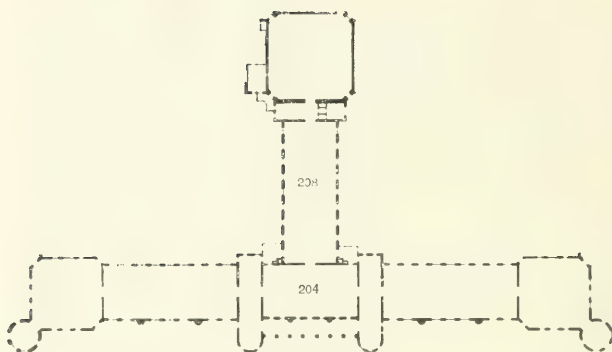
Associate Curator of Mammalogy and Ornithology

GUIDE LEAFLET No. 14.

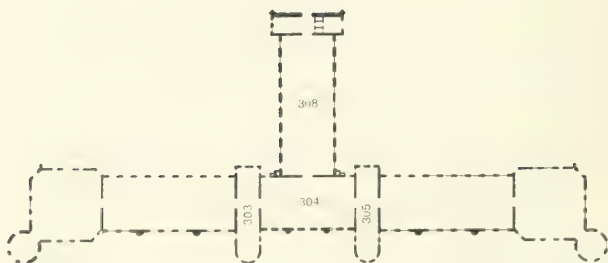
SUPPLEMENT TO THE AMERICAN MUSEUM JOURNAL,

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SECOND, OR MAIN, FLOOR.



THIRD, OR GALLERY, FLOOR.

Key-plans of the Main and Gallery, showing the location of the halls in which the special exhibits are shown. For further reference, see this Guide Leaflet.

BIRDS' NESTS AND EGGS.

WITH AN ANNOTATED LIST OF THE BIRDS KNOWN TO BREED
WITHIN FIFTY MILES OF NEW YORK CITY.

By FRANK M. CHAPMAN,

Associate Curator, Department of Mammalogy and Ornithology.

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BIRDS' NESTS.

(See the groups in Halls No. 204, 208, 304, 305 and 308, and the desk-cases in Halls No. 208 and 303.)

Nesting Season. — The first bird to nest in the region within fifty miles of New York City is the Great Horned Owl. The eggs of this locally rare species have been found as early as February 28, a date when the ground may be covered with snow and the nest itself decorated with icicles. This Owl is followed early in March by the more common Barred Owl, then come the Duck Hawk (Group, Hall No. 204), Woodcock (Group, Hall No. 208), Screech Owl (Group, Hall No. 208), Red-shouldered Hawk (Group, Hall No. 204), Red-tailed Hawk and so on through the list of our 120 breeding birds until we reach the Goldfinch and Cedar Waxwing which do not begin housekeeping until the middle of June.

Year after year essentially the same order of nesting is observed and the question may well be asked, What cause or causes determine the time of a bird's nesting season? Primarily, it may be replied, the date when a bird breeds is governed by the character of the food of its young. Young birds, particularly those

which are born naked and are reared in the nest, are dependent on their parents for food. Often a brood is fed several hundred times during the day and it is therefore of the first importance that there should be an abundant, easily accessible supply of the proper kind of food.

It may be noted that the first birds to nest are Hawks and Owls, which are predaceous, flesh-eating birds living largely on small mice and the like, and have no difficulty in supplying the wants of their young early in the season. In time these birds are followed by seed-, insect- and fruit-eating species, the young of which, therefore, are not hatched until the food they demand can be obtained.

The time of a bird's nesting season is also determined by its status in its breeding range, that is, whether it be a resident or a migratory species. Generally speaking, those species which are with us throughout the year nest earlier than migratory birds of similar habits. It does not always follow, however, that among migratory birds the first species to arrive in the spring are among the earliest to nest; and we learn, furthermore, that the time of a bird's nesting season is dependent on the character of its nesting-site. In this matter of site concealment is usually of the utmost consequence and a bird does not begin to build its nest until it can be properly hidden. For example, Red-winged Blackbirds reach this vicinity as early as the first of March, but they do not nest until the first half of May. The Woodcock, on the contrary, arrives about two weeks later, but nests more than a month earlier, its eggs sometimes being found as early as April 1. The Woodcock, however, nests on the ground and a site is available as soon as it reaches its summer home, while the Red-wing, swinging its woven basket among cat-tails or in bushes, awaits the growth of vegetation which will conceal it. Doubtless, also, the fact that the young Woodcock leave the nest within an hour or two after their birth, while young Red-wings are in the nest about two weeks, may be in part responsible for this difference in nesting dates.

Nesting Site. After the formalities of courtship have won for a bird its mate, nest-building naturally follows as soon as a proper site has been selected. The nature of the situation in which a bird builds its nest appears to be determined *first*, by the necessity

for concealment (see groups of Song Sparrows, Worm-eating Warbler, Black and White Warbler, Hummingbird and others); *second*, by habits, whether arboreal, terrestrial or aquatic (compare the nests of the Red-shouldered Hawk, Kingbird, Grouse, Bob-white, Coot and Grebe); *third*, by haunt, whether in woodland or field, marsh or seashore, etc. (compare the nesting sites of the Catbird, Field Sparrow, Clapper-Rail and Common Tern); *fourth*, by temperament, whether social or solitary (compare the nesting habits of the Duck Hawk and Red-shouldered Hawk with those of the Cliff or Bank Swallow as shown in the groups in Halls No. 204 and 208).

The Nest Itself. — Probably less than twenty, possibly not more than ten, per cent of the eggs laid by our smaller, perching birds bring forth chicks which reach maturity. So great, therefore, is the mortality among birds in the nest that it is of vital importance for a bird to select a site and build a home in which its eggs may be incubated and young reared with the least possible exposure to the dangers which beset birds at this season.

The character of a bird's nest depends fundamentally on the following factors:

First, Condition of Young at Birth. — Some birds are born covered with feathers and can swim or run about a few hours after leaving the shell. These are termed *præcocial* birds. Others are born practically naked and pass several weeks in the nest. These are termed *altricial* birds. With *præcocial* birds the nest is merely an incubator in which, with the aid of heat supplied by the parent bird, the eggs are hatched. With *altricial* birds the nest is not only an incubator but a cradle as well. It is obvious, therefore, that the nests of the latter class should be far more complete structures than those which are to shelter young birds only while their natal costume is drying. It is also to be remembered that *præcocial* birds nest on the ground, an additional reason why a well-made home is not needed.

Compare the nests and young of the Yellow-headed Blackbird and Warbling Vireo with those of the common Tern, Skimmer or Black Rail and one realizes the close relation existing between birds' nests and the condition in which the young leave the eggs.

Second, Haunt. — The nature of a bird's haunts is often reflected in its nest through the materials employed in construction. Coots and Yellow-headed Blackbirds (Group, Hall No. 308), Red-winged Blackbirds and Marsh Wrens (Group, Hall No. 304) use reeds and marsh grasses; field-inhabiting birds employ the grasses and weed-stalks they find about them, and leaves enter largely into the nest of wood-loving birds. (Examine the groups of the Field Sparrow and the Oven-bird in Hall No. 308.)

Third, Structure of the Bird. — Although birds possessed of the same type of nest-building tools, that is, bill and feet, may build wholly unlike nests (compare the Cliff and Bank Swallows and their nests, Groups in Hall No. 208) the character of the nest is in some degree affected by the structure of the bird. Thus a soft-billed Dove would not be expected to hew out a cavity in trees as do the Woodpeckers, nor could the weak-footed, short-billed Whip-poor-will cling to swaying branches and weave the Oriole's pendent cradle.

Fourth, Necessity for Concealment. — While concealment is secured chiefly through the selection of a site, it is also obtained in the building of the nest. The Oriole's deep cradle (Group, Hall No. 308) is a good type, and further illustrations are furnished by the admirably designed nests of the Oven-bird and Humming-bird, each of which, in a wholly different way, is made to resemble its immediate surroundings.

Variations in Nesting Habits. — The existing nesting habits of birds have doubtless been developed through adaptations to changing conditions, and it is of especial interest, therefore, to note any variation in the character of a bird's nest or nesting site and to learn whether the change is a response to some new factor in environment. Barn and Eaves Swallows, Chimney Swifts, Phœbes, Bluebirds and Wrens, for example, have, as a result of the invasion of their haunts by man, adopted new types of nesting sites, while Orioles, Vireos, House Finches and other species often find strings, rags and paper more desirable nest-material than fibres, rootlets and bark.

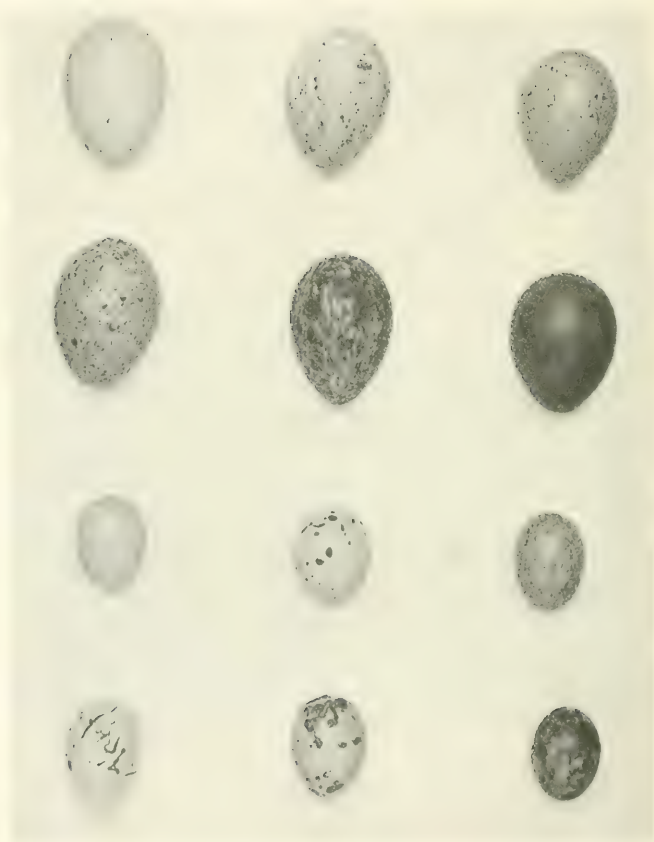
Second Broods. — Several of our earlier nesting species, the Robin, Song Sparrow and Phœbe, for example, rear second and

occasionally even third broods, which sometimes prolongs their nesting season into August. As a rule a new nest is built for the new family.

Return to Same Nesting Site. — In some instances, the Fish Hawk for example (Group, Hall No. 305), it is known that the same birds not only return to their former nesting localities, but that they actually occupy the same nest, making additions to it year after year.



CLAPPER RAIL
Group, Hall No. 2



VARIATIONS IN COLOR OF BIRDS' EGGS

Six upper figures, eggs of the Crow; six lower figures, eggs of Purple Grackle

To show use, Alcove No. 3, Hall No. 208

BIRDS' EGGS.

(See desk-cases in Hall No. 208, and Local Collection, Hall No. 303.)

Number of Eggs in a "Set" or "Clutch." — The number of eggs comprising a full "set" or "clutch" ranges from one to as many as twenty. No law governing this number is known. Generally speaking birds of the same family lay approximately the same number of eggs, but there is much variation between birds of closely related families (*e.g.*, Loons and Grebes), while birds of similar nesting habits may not lay the same number of eggs (*e.g.*, Quail and Meadowlark).

The number of eggs in a set, or clutch, is no indication of the fecundity of the bird. At the time of laying the ovary contains a large number of partly formed eggs, of which, normally, only the required number will become fully developed. But if the nest be robbed, the stolen eggs will sometimes be replaced. The long-continued laying of our domestic fowls is an instance of this unnatural stimulation of the ovary caused by persistent robbing.

Size of Eggs. — The size of the egg depends primarily upon the size of the bird. The graduated series, from an Ostrich to a Hummingbird (Alcove No. 3, Hall No. 208) represents the range of variation among the eggs of living birds. Size, however, is further influenced by the condition of the young when hatched. Præocial birds, for example, the domestic fowls, lay relatively larger eggs than altricial birds, for example, Pigeons.

This will be appreciated by comparing the egg of the Crow with that of Wallace's Megapode, or the eggs of the Meadowlark with those of the Bartramian Sandpiper (See desk-case, Alcove No. 3, Hall No. 208). The young of the Crow and the Meadowlark are hatched naked and are reared in a well-formed nest. The Sandpiper lays its eggs in a slight depression in the ground, and its young run about soon after birth. The Megapode buries its egg and leaves it to be hatched by the heat generated by decay of the vegetable debris in which it is placed. The young are born fully feathered and ready to fly.

The period of incubation depends upon the size of the egg, and varies from twelve days in the smaller Passeræ to fifty-six in the Emeu.

The Shell. — The egg-shell is composed largely of carbonate of lime, which is deposited in layers on the surface of the egg in the lower, or uterine, dilation of the oviduct, the process requiring from twelve to twenty hours. The final layers vary greatly in character, and may be simply a rough, chalky deposit, easily scraped off, showing the harder layer below, as in Gannets and Flamingoes, or thin and highly polished, as in Woodpeckers and Tinamous. The structure of the surface, whether pitted or smooth, depends upon the action of the walls of the uterus, from which it receives an impression.

Colors of Eggs. — The colors of eggs are due to pigments deposited by ducts while the egg is receiving its shell. One or all the layers of the shell may be pigmented, and variation in color may be caused by a super-imposed stratum of carbonate of lime, producing lilac tints and "clouded" or "shell" markings. It is supposed that eggs are colored for the purpose of rendering them less conspicuous, and, as a rule, birds which nest in holes lay white eggs.

Shape of Eggs. — Birds' eggs are generally ovate in form, but there are many variations from this shape. The conical eggs of Snipes and Plovers are placed in the nest point downward or inward, and they fit together so closely that they can easily be covered by the comparatively small-bodied parent. The pyriform egg of Murres, when moved slowly, describes a circle about its own point, and is therefore less liable to roll off the rocky cliffs on which it is laid, than one more oval in shape would be. Contrary to the generally prevalent idea, the egg passes down the oviduct and is deposited large end first.

Individual Variations. — Although, generally speaking, eggs of the same species resemble one another, there is so great a range of variation in both color and pattern, that it frequently is impossible to identify eggs unless the parent is known. This variation is due largely to the physiological condition of the bird. Fully adult, vigorous individuals of birds which lay colored eggs, secrete a larger amount of pigment than their younger or weaker

fellows, and their eggs are therefore more heavily marked. The first eggs, as well as the earlier sets, where more than one set is laid in a season, are apt to be more strongly pigmented than the later.



YELLOW-BILLED CUCKOO

Group, Hall No. 308



BLACK DUCK
Group, Hall No. 208

THE BIRDS KNOWN TO BREED WITHIN FIFTY MILES OF NEW YORK CITY.

1. (6.) ¹ **Pied-billed Grebe** (*Podilymbus podiceps*). *Local status:* Chiefly a migrant, sometimes wintering and probably breeding rarely. *Eggs:* 6-10, soiled whitish. *Date:* No definite record. Group, Hall No. 208.

2. (58.) **Laughing Gull** (*Larus atricilla*). *Local status:* An uncommon migrant and rare summer resident, nesting now, if at all, in a few localities on Great South Bay. *Site:* Salt marshes. *Eggs:* 3-5, grayish olive-brown or greenish gray, spotted, blotched and scrawled with chocolate. *Date:* June 8. Group, Hall No. 208.

3. (70.) **Common Tern; Sea Swallow; Mackerel Guil** (*Sterna hirundo*). *Local status:* Formerly an abundant summer resident, but since its destruction by milliners a comparatively uncommon migrant. It is doubtful if it nests nearer than Gardiner's Island. *Site:* Beaches and sometimes adjoining uplands. *Eggs:* 2-3, very variable, usually olive-gray or olive-green marked with chocolate. *Date:* May 8. Group, Hall No. 308.

4. (133.) **Black Duck** (*Anas obscura*). *Local status:* A common migrant and winter visitant; not known to nest nearer than Gardiner's Island. *Site:* On the ground, in undergrowth or heavy grasses, not necessarily in the immediate vicinity of water. *Eggs:* 8-12, pale greenish or bluish white or creamy. *Date:* May 5. Group, Hall No. 208.

5. (144.) **Wood Duck** (*Aix sponsa*). *Local status:* A not uncommon migrant; rare and local in the summer. *Site:* A hollow in a tree, usually twenty feet or more from the ground. *Eggs:* 8-14, pale buffy white. *Date:* May 6.

6. (190.) **Bittern** (*Botaurus lentiginosus*). *Local status:* Not uncommon migrant; rare summer resident. *Site:* On the ground in grassy marshes. *Eggs:* 3-5, pale olive-buff. *Date:* May 10.

7. (191.) **Least Bittern** (*Ardetta exilis*). *Local status:* Rather rare and local summer resident, more common and generally distributed during migrations. *Site:* Reedy marshes, usually 2-4 feet above water. *Eggs:* 4-6, bluish white. *Date:* May 31.

8. (201.) **Little Green Heron** (*Butorides virescens*). *Local status:* Common summer resident. *Site:* Bushes or trees from 5-20 feet from the ground. *Eggs:* 4-5, pale, dull blue. *Date:* May 6.

9. (202.) **Black-crowned Night Heron** (*Nycticorax nycticorax naevius*). *Local status:* Locally abundant summer resident, nesting in colonies. *Site:* In trees 20-80 feet from the ground. *Eggs:* 4-6, pale, dull blue. *Date:* May 1.

10. (208.) **Kinz Rail** (*Rallus elegans*). *Local status:* Rare summer resident. *Site:* On the ground in grassy fresh-water marshes. *Eggs:* 7-12, buffy white, heavily spotted and speckled with rufous-brown. *Date:* May 15.

11. (211) **Clapper Rail; Mud Hen** (*Rallus crepitans*). *Local status:*

¹ The numbers between parentheses refer to the Check-List of North American Birds of the American Ornithologists Union.



WOODCOCK
Group, Hall No. 208

Abundant summer resident. *Site*: On the ground in salt, coastal marshes. *Eggs*: 8-12, buffy white, speckled and spotted with rufous-brown. *Date*: May 1. Group, Hall No. 208.

12. (212.) **Virginia Rail** (*Rallus virginianus*). *Local status*: Rather rare and local summer resident. *Site*: On the ground in marshy places. *Eggs*: 6-12, pale buffy white, spotted and speckled with rufous brown. *Date*: May 15.

13. (214.) **Sora; Carolina Rail** (*Porzana carolina*). *Local status*: Rare summer resident on Long Island; abundant fall migrant in wild rice marshes. *Site*: On ground in marshy place. *Eggs*: 8-15, buffy white, spotted and speckled with rufous-brown. *Date*: May 20.

14. (208.) **American Woodcock** (*Philohela minor*). *Local status*: Not uncommon summer resident. *Site*: On the ground in or near woods. *Eggs*: 4-6, buff, distinctly and obscurely spotted with shades of rufous. *Date*: April 7. Group, Hall No. 208.

15. (261.) **Upland Plover; Bartramian Sandpiper** (*Bartramia longicauda*). *Local status*: Uncommon and local summer resident. *Site*: On the ground in open field. *Eggs*: 4, creamy white, or buff, spotted with reddish brown or chocolate, chiefly at the larger end. *Date*: June 1.

16. (263.) **Spotted Sandpiper; Tip-up** (*Actitis macularia*). *Local status*: Common summer resident. *Site*: On the ground, usually near water. *Eggs*: 4, creamy buff or white, thickly spotted and speckled with chocolate, chiefly at the larger end. *Date*: May 4.

17. (273.) **Killdeer** (*Oxyechus vociferus*). *Local status:* Rare and local summer resident. *Site:* On the ground in pastures or cornfields. *Eggs:* 4, buffy white, spotted and scrawled with chocolate, chiefly at the larger end. *Date:* May 10.

18. (289.) **Bob-White** (*Colinus virginianus*). *Local status:* Not uncommon resident. *Site:* On the ground in fields, often near fences or hedges. *Eggs:* 10-18, white. *Date:* May 26. Group, Hall No. 208.

19. (300.) **Ruffed Grouse** (*Bonasa umbellus*). *Local status:* Of local distribution in the more heavily wooded sections. *Site:* On the ground in the woods, often at the base of a tree. *Eggs:* 8-14, pale ochraceous-buff. *Date:* May 10. Group, Hall. No. 208.

20. (316.) **Mourning Dove** (*Zenaidura macroura*). *Local status:* Common summer resident. *Site:* Lower branches of trees, generally within 10 feet of the ground, very rarely on the ground. *Eggs:* 2, white. *Date:* April 25.

21. (331.) **Marsh Hawk** (*Circus hudsonius*). *Local status:* Common summer resident, of rare occurrence in winter. *Site:* On the ground in marshes. *Eggs:* 4-6, dull white or pale bluish white. *Date:* May 20.

22. (332.) **Sharp-shinned Hawk** (*Accipiter velox*). *Local status:* Not common summer resident, rare in winter. *Site:* In trees, 15-40 feet from the ground. *Eggs:* 3-6, varying from bluish to pale cream buff, distinctly spotted or heavily blotched with cinnamon or cinnamon rufous. *Date:* May 21.

23. (333.) **Cooper Hawk** (*Accipiter cooperii*). *Local status:* Not uncommon in summer, rare in winter. *Site:* In trees, 25-60 feet from the ground. *Eggs:* 3-6, pale bluish white, sometimes speckled with brownish. *Date:* May 1.

24. (337.) **Red-tailed Hawk** (*Buteo borealis*). *Local status:* Permanent resident, more numerous in winter. *Site:* In trees, 30-70 feet from the ground. *Eggs:* 2-4, dull white, generally scantily and irregularly marked with cinnamon-brown. *Date:* April 1.

25. (339.) **Red-shouldered Hawk** (*Buteo lineatus*). *Local status:* Common permanent resident. *Site:* In trees, 30-60 feet from the ground. *Eggs:* 2-5, dull white, generally more or less sprinkled, spotted or blotched with cinnamon or chocolate. *Date:* April 3. Group, Hall No. 204.

26. (343.) **Broad-winged Hawk** (*Buteo platypterus*). *Local status:* Not common permanent resident. *Site:* In trees, 25-50 feet from the ground. *Eggs:* 2-4, dull white, speckled, blotched or washed with ochraceous-buff or cinnamon brown. *Date:* May 5.

27. (356.) **Duck Hawk** (*Falco peregrinus anatum*). *Local status:* Rare and local summer resident, more common on coasts in migrations. *Site:* A cliff. *Eggs:* 3-4, creamy white marked with cinnamon-brown to reddish brown. *Date:* March 30.

28. (360.) **Sparrow Hawk** (*Falco sparverius*). *Local status:* Not uncommon in summer, rare in winter. *Site:* Usually a hole in a tree, from 15-60 feet from the ground. *Eggs:* 3-7, creamy white to rufous, generally finely and evenly marked with shades of the ground color. *Date:* April 25.

29. (374.) **American Osprey; Fish Hawk** (*Pandion haliaetus carolinensis*). *Local status:* Locally common summer resident near the coasts. *Site:* In a tree, 15-50 feet from the ground. *Eggs:* 2-4, rarely dull white, sometimes almost solid chocolate, generally buffy white, heavily marked with chocolate, chiefly at the larger end. *Date:* May 2. Group, Hall No. 205.

LOCAL BREEDING BIRDS

30. (365.) **Barn Owl** (*Strix pratincola*). *Local status:* A rare summer resident. *Site:* A hole in a tree, sometimes in a tower or church-steeple. *Eggs:* 5-9, white. *Date:* April 20.

31. (366.) **Long-eared Owl** (*Asio wilsonianus*). *Local status:* An uncommon resident. *Site:* Generally in an old crow's, hawk's or squirrel's nest. *Eggs:* 3-6, white. *Date:* April 1.

32. (368.) **Barred Owl** (*Syrnium varium*). *Local status:* Common permanent resident. *Site:* In a hollow tree, and sometimes in an old crow's or hawk's nest. *Eggs:* 2-4, white. *Date:* March 12.

33. (373.) **Screech Owl** (*Megascops asio*). *Local status:* Common permanent resident. *Site:* Generally in a hollow tree. *Eggs:* 4-6, white. *Date:* April 3. Group, Hall No. 208.

34. (375.) **Great Horned Owl** (*Bubo virginianus*). *Local status:* Rare permanent resident, restricted to the less settled and heavily wooded regions. *Site:* Generally an old hawk's, squirrel's or crow's nest. *Eggs:* 2-3, white. *Date:* February 28.

35. (386.) **Black-billed Cuckoo** (*Coccyzus erythrophthalmus*). *Local status:* Common summer resident. *Site:* Generally in low trees, vines or bushes, 4-10 feet from the ground. *Eggs:* 2-5, dull greenish blue. *Date:* May 29.

36. (387.) **Yellow-billed Cuckoo** (*Coccyzus americanus*). *Local status:* Common summer resident. *Site:* Generally in low trees, vines or bushes, 4-10 feet from the ground. *Eggs:* 3-5, dull greenish blue. *Date:* May 30. Group, Hall No. 308.

37. (390.) **Kingfisher** (*Ceryle alcyon*). *Local status:* Locally common summer resident. *Site:* In a hole in a bank, about 6 feet from the entrance. *Eggs:* 5-8 white. *Date:* May 1.

38. (393.) **Hairy Woodpecker** (*Dryobates villosus*). *Local status:* Not uncommon permanent resident. *Site:* In a hole, generally in a dead tree. *Eggs:* 4-5, white. *Date:* May 23.

39. (394.) **Downy Woodpecker** (*Dryobates pubescens medianus*). *Local status:* Very common permanent resident. *Site:* In a hole, generally in a dead tree. *Eggs:* 4-6, white. *Date:* May 21.

40. (406.) **Red-headed Woodpecker** (*Melanerpes erythrocephalus*). *Local status:* Local summer resident of irregular distribution, sometimes winters, rarely abundant in migrations. *Site:* A hole, generally in a dead tree. *Eggs:* 4-6, white. *Date:* May 13.

41. (412.) **Flicker; High-hole** (*Colaptes auratus luteus*). *Local status:* Common summer resident, abundant migrant, rare in winter. *Site:* In a hole in a tree, frequently in orchards, about 15 feet from the ground. *Eggs:* 5-9, white. *Date:* May 7.

42. (417.) **Whip-poor-will** (*Antrostomus vociferus*). *Local status:* Locally common summer resident. *Site:* No nest, the eggs being laid on the bare ground or dead leaves in the woods. *Eggs:* 2, dull white, with delicate, obscure, blue markings and a few distinct brownish gray specks. *Date:* June 3.

43. (418.) **Nighthawk** (*Ochotona virginiana*). *Local status:* Locally common summer resident, frequently seen in the city. *Site:* Nest, none, the eggs being laid on the bare ground, in open fields, or on the flat roof of a house. *Eggs:* 2, dull white, evenly marked with small irregular shaped blotches or speckling of grayish brown or brownish gray. *Date:* June 1.



RUFFED GROUSE
Group, Hall No. 282

LOCAL BREEDING BIRDS

44. (423.) **Chimney Swift** (*Chatura pelagica*). *Local status:* Abundant summer resident, frequenting the city in numbers. *Site:* The inside of a chimney. The nest is attached to the side, generally about 10 feet from the top. *Eggs:* 4-6, white. *Date:* May 25. Group, Hall No. 208.

45. (428.) **Ruby-throated Hummingbird** (*Trochilus colubris*). *Local status:* Common summer resident. *Site:* The limb of a tree, generally 10-25 feet from the ground. *Eggs:* 2, white. *Date:* May 12. Group, Hall No. 308.

46. (444.) **Kingbird** (*Tyrannus tyrannus*). *Local status:* Common summer resident. *Site:* Usually orchards or shade trees, near the end of a branch, 15-25 feet from the ground. *Eggs:* 3-5, white, spotted with umber. *Date:* May 26. Group, Hall No. 328.

47. (452.) **Crested Flycatcher** (*Myiarchus crinitus*). *Local status:* Common summer resident. *Site:* In a hollow tree, generally less than 20 feet from the ground. *Eggs:* 3-6, creamy white streaked longitudinally with chocolate. *Date:* June 3.

48. (456.) **Phœbe** (*Sayornis phæbe*). *Local status:* Common summer resident. *Site:* A beam or rafter in an outbuilding or under a piazza or bridge, often under a look or shelving rock. *Eggs:* 4-6, white. *Date:* April 28.

49. (461.) **Wood Pewee** (*Contopus virens*). *Local status:* Common summer resident. *Site:* Generally saddled on a limb 20-30 feet from the ground. *Eggs:* 3-4, white, with a wreath of umber markings about the larger end. *Date:* June 1.

50. (465.) **Green-crested or Acadian Flycatcher** (*Empidonax virens*). *Local status:* Common summer resident in the Hudson Valley as far north as Ossining; apparently rare elsewhere. *Site:* The lower limbs of a tree, often at a height about eight feet from the ground. *Eggs:* 3-4, white, with a few cinnamon spots. *Date:* May 14. Group, Hall No. 308.

51. (466.) **Alder Flycatcher** (*Empidonax traillii alnerum*). *Local status:* Not common migrant, rare and local summer resident, has been found nesting only at Nyack, N. Y., and Plainfield, N. J. (Miller). *Eggs:* 3-4, creamy white, with cinnamon brown markings about the larger end. *Date:* June 16.

52. (467.) **Least Flycatcher; Chebec** (*Empidonax minimus*). *Local status:* Common summer resident. *Site:* Generally in a crotch of a fruit or shade tree, 10-20 feet from the ground. *Eggs:* 3-5, white. *Date:* May 24.

53. (477.) **Blue Jay** (*Cyanocitta cristata*). *Local status:* Permanent resident, abundant in fall, common in winter, less numerous in summer. *Site:* Usually in crotch of a tree 10-20 feet from the ground. *Eggs:* 4-6, pale olive-green, rather thickly marked with varying shades of cinnamon brown. *Date:* May 14.

54. (478.) **American Crow** (*Corvus americanus*). *Local status:* Abundant permanent resident. *Site:* In trees in woods, 20 to 30 feet from the ground. *Eggs:* 4-6, generally bluish green, thickly marked with shades of brown, but sometimes light blue or even white with almost no markings. *Date:* April 9.

55. (490.) **Fish Crow** (*Corvus ossifragus*). *Local status:* Common summer resident of Hudson Valley as far north as Ossining, less so on Long Island, in winter restricted to the coast. *Site:* In trees in woods, generally 20-50 feet from the ground. *Eggs:* 4-6, similar in color to those of preceding species, but smaller. *Date:* May 17.

56. (493.) **Starling** (*Sturnus vulgaris*). *Local status:* Introduced into



SCREECH OWL
Group, Hall No. 238

LOCAL BREEDING BIRDS

Central Park in 1860 and now a common permanent resident. *Site*: Holes in buildings or in trees. *Eggs*: 4-6, pale bluish.

57. (494.) **Bobolink; Reedbird** (*Dolichonyx oryzivorus*). *Local status*: Locally common summer resident, apparently decreasing in numbers, abundant fall migrant in wild rice marshes. *Site*: On the ground in pastures and meadows. *Eggs*: 4-6, grayish white, with numerous spots of olive-brown or umber. *Date*: May 20.

58. (495.) **Cowbird** (*Molothrus ater*). *Local status*: A common summer resident and abundant migrant. *Site*: Parasitic, laying eggs in the nests of other species. *Eggs*: white, evenly speckled with cinnamon-brown or umber. *Date*: May 5.

59. (498.) **Red-winged Blackbird** (*Agelaius phoeniceus*). *Local status*: Abundant summer resident. *Site*: In grassy or bushy borders of pond, 3-6 feet from the ground, in reeds, bushes or tussock of grass. *Eggs*: 3-6, pale blue, streaked, spotted or scrawled with dark purple or black. *Date*: May 18. Group, Hall No. 304.

60. (501.) **Meadowlark** (*Sturnella magna*). *Local status*: Common summer resident, rare in winter. *Site*: On the ground, in pastures and meadows. *Eggs*: 4-6, white, speckled with reddish brown. *Date*: May 10.

61. (506.) **Orchard Oriole** (*Icterus spurius*). *Local status*: Locally common summer resident. *Site*: Generally in orchards, 10-15 feet from the ground, near the extremity of a limb. *Eggs*: 3-5, bluish white, spotted, blotched and scrawled with blackish. *Date*: May 30. Group, Hall No. 308.

62. (507.) **Baltimore Oriole** (*Icterus galbula*). *Local status*: Common summer resident. *Site*: Generally in fruit or shade trees, near the extremity of a limb, 20-40 feet from the ground. *Eggs*: 4-6, white, scrawled with blackish line and with a few spots or blotches. *Date*: May 25. Group, Hall No. 308.

63. (511.) **Purple Grackle; Crow Blackbird** (*Quiscalus quiscula*). *Local status*: Abundant migrant, locally common summer resident, nesting in colonies. *Site*: In colonies, generally in coniferous trees, about 30 feet from the ground. *Eggs*: 3-6, very variable, generally pale bluish or bluish green, spotted, blotched or scrawled with brown or black, but sometimes evenly speckled with brownish and rarely almost solid cinnamon- or rufous-brown. *Date*: April 25. Group, Hall No. 305.

64. (517.) **Purple Finch** (*Carpodacus purpureus*). *Local status*: Rare and local summer resident, common in migrations and sometimes in winter. *Site*: Generally in a coniferous tree, 5-30 feet from the ground. *Eggs*: 4-6, blue, spotted about the larger end with blackish. *Date*: May 24.

65. **House Sparrow; English Sparrow** (*Passer domesticus*). *Local status*: Introduced from Europe in 1831 and later dates and now an abundant permanent resident. *Site*: About buildings or in trees. *Eggs*: 4-7, generally white, back and sides only marked with olive, sometimes plain white or almost uniform olive-brown.

66. (520.) **Goldfinch** (*Carduelis tristis*). *Local status*: Common permanent resident. *Site*: In a limb or tree, 5-30 feet from the ground. *Eggs*: 4-6, pale bluish white. *Date*: June 1.

67. (540.) **Grass Finch; Vesper Sparrow** (*Peucaea ramnensis*). *Local status*: Common summer resident. *Site*: On the ground, generally in dry,



BANK SWALLOW
Group, Hall No. 298

grassy fields. *Eggs:* 4-5, bluish or pinkish, white, speckled and blotched with brown. *Date:* May 10.

68. (542a.) **Savanna Sparrow** (*Passerculus sandwichensis savanna*). *Local status:* Rare summer resident, abundant migrant. *Site:* On the ground, generally in wet meadows. *Eggs:* 4-5, bluish white, thickly marked with reddish brown or cinnamon. *Date:* May 17.

69. (546.) **Grasshopper Sparrow** (*Coturniculus savannarum passerinus*). *Local status:* Locally common summer resident. *Site:* On the ground in dry grassy fields. *Eggs:* 4-5, white, spotted and speckled with reddish brown. *Date:* May 28.

70. (547.) **Henslow Sparrow** (*Ammodramus henslowii*). *Local status:* Rare and local summer resident. *Site:* On the ground, generally in wet meadows. *Eggs:* 4-5, grayish white, thickly and evenly marked with pale reddish brown. *Date:* May 10.

71. (549.) **Sharp-tailed Finch** (*Ammodramus caudacutus*). *Local status:* Abundant summer resident in salt marshes. *Site:* On the ground, in salt marshes. *Eggs:* 3-4, whitish, finely speckled with cinnamon-brown, especially at the larger end. *Date:* May 30. Group, Hall No. 308.

72. (550.) **Seaside Finch** (*Ammodramus maritimus*). *Local status:* Abundant summer resident of salt coastal marshes. *Site:* On the ground, in salt marshes. *Eggs:* 3-4, whitish, clouded or finely speckled with cinnamon-brown, especially at the larger end. *Date:* May 30. Group, Hall No. 308.

73. (560.) **Chipping Sparrow** (*Spizella socialis*). *Local status:* Abundant summer resident. *Site:* In trees or bushes, near houses or cultivated grounds, 5-20 feet from the ground. *Eggs:* 4-5, greenish blue, with cinnamon-brown or blackish markings, chiefly at the larger end. *Date:* May 11.

74. (562.) **Field Sparrow** (*Spizella monticola*). *Local status:* Abundant summer resident. *Site:* In bushy fields, on the ground, or in a low shrub. *Eggs:* 4-5, whitish, with numerous reddish brown markings, chiefly about the larger end. *Date:* May 15. Group, Hall No. 308.

75. (581.) **Song Sparrow** (*Melospiza cinerea melodia*). *Local status:* Common winter, abundant summer resident. *Site:* Generally on the ground, sometimes in a low bush. *Eggs:* 4-5, whitish, with numerous reddish brown markings, which sometimes nearly conceal the ground color. *Date:* April 29. Group, Hall No. 308.

76. (584.) **Swamp Sparrow** (*Melospiza georgiana*). *Local status:* Abundant summer resident, rare in winter. *Site:* On the ground, in wet meadows or swamps. *Eggs:* 4-5, resemble those of the preceding species, but the markings generally more confluent. *Date:* May 15. Group, Hall No. 308.

77. (587.) **Towhee; Chewink** (*Pipilo erythrophthalmus*). *Local status:* Abundant summer resident. *Site:* On the ground, in or at the border of woods or thickets. *Eggs:* 4-5, white, finely and evenly speckled with reddish brown, sometimes blotched at the larger end. *Date:* May 14. Group, Hall No. 308.

78. (593.) **Cardinal** (*Cardinalis cardinalis*). *Local status:* Local permanent resident. *Site:* Generally in bushes or dense thickets. *Eggs:* 3-4, white or bluish white, spotted or speckled with grayish or reddish brown. *Date:* May 3. Group, Hall No. 208.



BLACK AND WHITE WARBLER

Group, Hall No. 303

79. (595.) **Rose-breasted Grosbeak** (*Zamelodia ludoviciana*). *Local status:* Common summer resident. *Site:* In bushes or small trees, 5-20 feet from the ground. *Eggs:* 4-5, pale blue, with numerous reddish brown or olive-brown markings. *Date:* May 20. Group, Hall No. 208.

80. (598.) **Indigo Bunting** (*Cyanospiza cyanea*). *Local status:* Common summer resident. *Site:* Generally in the crotch of a bush near the ground. *Eggs:* 3-4, pale bluish white. *Date:* May 29. Group, Hall No. 208.

81. (608.) **Scarlet Tanager** (*Piranga erythromelas*). *Local status:* Common summer resident. *Site:* Generally near the end of a horizontal limb, 7-20 feet from the ground. *Eggs:* 3-4, pale greenish blue with numerous reddish brown markings. *Date:* June 3. Group, Hall No. 304.

82. (611.) **Purple Martin** (*Progne subis*). *Local status:* Local summer resident, apparently decreasing in numbers. *Site:* In bird-boxes or gourds, erected for the bird's occupation. *Eggs:* 4-5, white, with numerous spots of olive-brown or reddish brown. *Date:* May 25.

83. (612.) **Cliff Swallow; Eaves Swallow** (*Petrochelidon lunifrons*). *Local status:* Local summer resident, apparently decreasing in numbers. *Site:* Placed beneath a cliff, or under the eaves of a barn or other building. *Eggs:* 4-5, white, with numerous blotches of olive-brown or reddish brown. *Date:* May 30. Group, Hall No. 208.

84. (613.) **Barn Swallow** (*Hirundo erythrogaster*). *Local status:* Abundant summer resident. *Site:* Generally placed on the rafter of a barn or out-building. *Eggs:* 4-6, white, with numerous blotches of olive-brown or reddish brown, and generally smaller than those of the preceding species. *Date:* May 8.

85. (614.) **Tree Swallow** (*Iridoprocne bicolor*). *Local status:* Rare and local summer resident, abundant migrant, particularly from late July to October. *Site:* In a hollow tree or bird box. *Eggs:* 4-7, white. *Date:* May 10.

86. (616.) **Bank Swallow** (*Riparia riparia*). *Local status:* Locally abundant summer resident. *Site:* In a hole in a sand-bank, 2-3 feet from the entrance. *Eggs:* 4-6, white. *Date:* May 19. Group, Hall No. 208.

87. (617.) **Rough-winged Swallow** (*Stelgidopteryx serripennis*). *Local status:* Local and not common summer resident. *Site:* Beneath bridges, in stone walls, or a hole in a bank. *Eggs:* 4-8, white. *Date:* May 30.

88. (619.) **Cedar Waxwing** (*Ampelis cedrorum*). *Local status:* Common summer resident. *Site:* Generally in fruit or shade trees, 5-20 feet from the ground. *Eggs:* 3-5, pale bluish gray, blotched with black or umber. *Date:* June 10.

89. (624.) **Red-eyed Vireo** (*Vireo olivaceus*). *Local status:* Abundant summer resident. *Site:* Suspended from a forked branch, 4-40 feet from the ground. *Eggs:* 3-4, white, with a few blackish spots about the larger end. *Date:* May 28.

90. (627.) **Warbling Vireo** (*Vireo gilvus*). *Local status:* Locally common summer resident. *Site:* Suspended from a forked branch, usually in shade trees, 8-40 feet from the ground. *Eggs:* 3-4, white, usually with a few blackish or brownish spots about the larger end. *Date:* May 30. Group, Hall No. 308.

91. (628.) **Yellow-throated Vireo** (*Vireo flavifrons*). *Local status:* Common summer resident. *Site:* Suspended from a forked branch, 10-30 feet from the ground. *Eggs:* 3-4, white, with a few specks or spots of blackish or brownish, chiefly about the larger end. *Date:* May 28.

92. (631.) **White-eyed Vireo** (*Vireo noveboracensis*). *Local status:* Common summer resident. *Site:* In thickets suspended from a forked branch, 1-4 feet from the ground. *Eggs:* 3-4, white, with a few specks of blackish or brownish at the larger end. *Date:* May 25. Group, Hall No. 308.

93. (636.) **Black and White Warbler** (*Mniotilta varia*). *Local status:* Common summer resident. *Site:* On the ground in the woods, generally at the base of tree, stump or rock. *Eggs:* 4-5, white, spotted and speckled with cinnamon brown to umber, chiefly in a wreath at the larger end. *Date:* May 18. Group, Hall No. 308.

94. (639.) **Worm-eating Warbler** (*Helmitheros vermivorus*). *Local status:* Rather rare and local summer resident. *Site:* On the ground, generally in dry woods. *Eggs:* 4-6, white, speckled, spotted or blotched with cinnamon- or reddish-brown. *Date:* May 20. Group, Hall No. 308.

95. (641.) **Blue-winged Warbler** (*Helminthophila pinus*). *Local status:* Generally common summer resident; not common on Long Island. *Site:* On the ground, usually in or near second growths. *Eggs:* 4-6, white, thinly speckled with reddish brown. *Date:* May 16. Group, Hall No. 308.

96. (642.) **Golden-winged Warbler** (*Helminthophila chrysoptera*). *Local status:* Rare summer resident, sometimes not uncommon August migrant.



WORM-EATING WARBLER

Group, Hall No. 308

Site: On the ground, usually in or near second growth. *Eggs:* 4-5, white, speckled, chiefly about the larger end, with brownish. *Date:* May 30.

97. (648.) **Parula Warbler** (*Compsothlypis americana usneae*). *Local status:* Common migrant, local summer resident, nesting only where *Usnea* moss occurs. *Site:* In bunches of hanging *Usnea* moss. *Eggs:* 4-5, white, with reddish brown markings, chiefly about the larger end. *Date:* May 22.

98. (652.) **Summer Yellowbird; Yellow Warbler** (*Dendroica aestiva*). *Local status:* Abundant summer resident. *Site:* In bushes or trees 4-20 feet from the ground. *Eggs:* 4-5, bluish white, thickly marked with brownish, with frequently a wreath about the larger end. *Date:* May 20. Group, Hall No. 308.

99. (659.) **Chestnut-sided Warbler** (*Dendroica pensylvanica*). *Local status:* Locally common summer resident, increasing in numbers. *Site:* In bushes, usually about 3 feet from the ground. *Eggs:* 4-5, white, with numerous cinnamon- and olive-brown markings, chiefly in a wreath about the larger end. *Date:* May 29.

100. (673.) **Prairie Warbler** (*Dendroica discolor*). *Local status:* Locally common on Long Island, rare elsewhere. *Site:* In berry bushes about 3 feet from the ground. *Eggs:* 4-5, white, spotted with cinnamon- or olive-brown, chiefly in a wreath at the larger end. *Date:* May 30. Group, Hall No. 308.

101. (674.) **Oven-bird** (*Sciurus aurocapillus*). *Local status:* Abundant summer resident. *Site:* On the ground, usually in dry woods. *Eggs:* 4-5, white speckled with reddish brown. *Date:* May 20. Group, Hall No. 308.

102. (676.) **Large-billed Water-Thrush** (*Sciurus motacilla*). *Local status:* Not uncommon summer resident in lower Hudson Valley and northern New Jersey, rare on Long Island. *Site:* In wet woods, beneath a bank, or the upturned roots of a fallen tree. *Eggs:* 4-6, white, speckled or spotted with reddish brown. *Date:* May 11.

103. (677.) **Kentucky Warbler** (*Gothlypis formosa*). *Local status:* Locally common in the Hudson River Valley as far north as Ossining, rare elsewhere. *Site:* In the woods, on or near the ground. *Eggs:* 4-5, white, speckled or blotched with reddish brown. *Date:* June 1.

104. (681.) **Northern Yellow-throat** (*Gothlypis trichas brachidactyla*). *Local status:* Abundant summer resident. *Site:* In swampy thickets, on the ground. *Eggs:* 4-5, white, thinly speckled and spotted with reddish brown, chiefly at the larger end. *Date:* May 28. Group, Hall No. 308.

105. (683.) **Yellow-breasted Chat** (*Icteria virens*). *Local status:* Common summer resident. *Site:* In thickets, 2-3 feet from the ground, in the crotch of a bush. *Eggs:* 3-5, white, rather evenly speckled and spotted with reddish brown. *Date:* May 23.

106. (684.) **Hooded Warbler** (*Wilsonia mitrata*). *Local status:* Common summer resident in the lower Hudson Valley and eastward along the Sound, apparently a rare breeder elsewhere. *Site:* In woods, 2-4 feet from the ground, in the crotch of a bush or sapling. *Eggs:* 4-5, creamy white, thinly speckled or spotted with reddish brown; color generally in a wreath at the larger end. *Date:* May 15.

107. (687.) **Redstart** (*Setophaga ruticilla*). *Local status:* Abundant summer resident. *Site:* In the crotch of a sapling, 5-20 feet from the ground. *Eggs:* 4-5, bluish white, spotted and blotched, chiefly at the larger end, with cinnamon- or olive-brown. *Date:* May 17. Group, Hall No. 308.

108. (704.) **Catbird** (*Galoscotes carolinensis*). *Local status:* Abundant summer resident. *Site:* In thickets, about 3-5 feet from the ground. *Eggs:* 3-5, greenish blue. *Date:* May 17.

109. (705.) **Brown Thrasher** (*Toxostoma rufum*). *Local status:* Common summer resident. *Site:* In thickets, in the fork of a bush, or on the ground. *Eggs:* 3-6, grayish white, thickly, evenly and minutely speckled with reddish brown. *Date:* May 16. Group, Hall No. 308.

110. (718.) **Carolina Wren** (*Thryothorus ludovicianus*). *Local status:* Permanent resident of irregular distribution, evidently increasing in numbers. *Site:* In a hole in a tree, bird-box or out house. *Eggs:* 4-6, creamy white, with numerous reddish-brown and lavender markings. *Date:* March 28.

111. (719.) **House Wren** (*Troglodytes aedon*). *Local status:* Common summer resident. *Site:* In a hole in a tree or stump, a bird-box or crevice in a building. *Eggs:* 6-8, vinaceous, uniform or minutely speckled, with generally a wreath of darker shade at the larger end. *Date:* May 18.



LOUISIANA WATER-THRUSH

Group, Hall No. 346



LONG-BILLED MARSH WREN

Group, H. d. N. 1, 1900

112. (724.) **Short-billed Marsh Wren** (*Cistothorus stellaris*). *Local status:* Local summer resident, generally rare. *Site:* On or near the ground in a tussock of tall grass. *Eggs:* 6-8, white, rarely with a few lavender spots. *Date:* June 7.

113. (725.) **Long-billed Marsh Wren** (*Telmatodytes palustris*). *Local status:* Abundant summer resident. *Site:* In marshes, attached to reeds, about 4 feet from the ground. *Eggs:* 5-9, uniform, minutely speckled or thickly marked with cinnamon- or olive-brown. *Date:* May 31. Group, Hall No. 304.

114. (727.) **White-bellied Nuthatch** (*Sitta carolinensis*). *Local status:* Common permanent resident. *Site:* In a hole in a tree or stump. *Eggs:* 5-8, creamy white, thickly and evenly spotted and speckled with rufous and lavender. *Date:* April 17.

115. (731.) **Tufted Titmouse** (*Baeolophus bicolor*). *Local status:* Not uncommon permanent resident in northern New Jersey and on Staten Island, sometimes extending farther north. *Site:* In a hole in a tree, stump or similar situation. *Eggs:* 5-8, creamy white, rather coarsely and evenly marked with reddish brown. *Date:* May 22.

116. (735.) **Chickadee** (*Parus atricapillus*). *Local status:* Common permanent resident, less numerous in summer. *Site:* In an old stump or hollow limb, 5-15 feet from the ground. *Eggs:* 5-9, white, spotted and speckled, chiefly at the larger end, with reddish brown. *Date:* May 10.

117. (755.) **Wood Thrush** (*Hylocichla mustelina*). *Local status:* Abundant summer resident. *Site:* Generally in the woods, in a sapling about 6-8 feet from the ground. *Eggs:* 3-5, greenish blue. *Date:* May 17. Group, Hall No. 208.

118. (756.) **Wilson Thrush; Veery** (*Hylocichla fuscescens*). *Local status:* Common summer resident. *Site:* In low, wet woods, on or near the ground. *Eggs:* 3-5, greenish blue. *Date:* May 20.

119. (761.) **American Robin** (*Merula migratoria*). *Local status:* Our most abundant summer resident, of not infrequent occurrence during winter. *Site:* In a variety of situations, most frequently in fruit or shade trees, 5-30 feet from the ground. *Eggs:* 3-5, greenish blue. *Date:* April 20. Group, Hall No. 308.

120. (766.) **Bluebird** (*Sialia sialis*). *Local status:* Common summer resident, not rare in winter. *Site:* In a hollow tree or bird-house. *Eggs:* 4-6, bluish white. *Date:* April 10.





FUNERAL URNS FOUND IN A MOUND, VALLEY OF OAXACA

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FUNERAL URNS FROM OAXACA.



AMONG the most interesting remains of the ceramic art in Mexico are the funeral urns which have been found in ancient mounds containing tombs in the Valleys of Etla, Oaxaca and Tlacolula, in the central part of the State of Oaxaca. They are, as a class, perhaps the most important objects of this phase of culture left by the old Mexican peoples.

In the exploration of the ancient tombs in the Valley of Oaxaca by the Loubat Expeditions sent out by The American Museum of Natural History, many of these funeral urns were found, varying in size, shape and detail.* They were on the floor in front of the door, on the roof, fastened into the façade, or in niches over the door. They seem never to have been placed in the burial chambers. As a rule they were deposited in series of fives and nothing was placed in them. One group is illustrated on page 53 in place as found. Dupaix, in his description of a funeral urn of the box-and-cover form, which he collected in 1806, states that it was found in Zachila "with *four* others of similar size, shape and substance in ploughing a piece of ground."

The Museum is indebted to Mrs. Robert W. De Forest for five superb pieces which were found recently in a mound in the Valley of Oaxaca. They form a complete series, the only one known which is thus preserved intact. The specimens, which average about fifteen inches in height, are illustrated on page 50.

The first figure on the left represents a seated woman dressed in simple skirt and shirt with a heavy band around the neck. The right hand grasps a cylindrical object, while the left hand is

* A brief account of the discoveries made at Xoxo may be found in "Exploration of Zapotecan Tombs in Southern Mexico," by Marshall H. Saville. *Amer. Anthropologist*, (N. S.) Vol. I., April, 1899.

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covered with a square object which may represent a musical instrument to be beaten by the cylinder in the right hand. The head is covered with an elaborate head-dress. Directly above the forehead is a hieroglyph often seen on funeral urns, above



ENTRANCE OF A TOMB AT CUILAPA

which is an animal's head, and above and behind that is what is probably a flint knife, rising from the ray-like background of the head-dress.

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The second urn represents a standing man with a bat-like head and tiger-like hands. The hands are held with the upright palms outward close to the body. The body is clothed with a loin cloth, and also has a necklace.

The third urn, shown in the center, is a man seated cross-legged on a pedestal or platform, with incised designs on the front. This figure has the hands on the knees. It is clothed with a short cape around the shoulders, and a loin cloth covers a part of the legs. A hieroglyph, hanging from a strap around the neck, forms a breast ornament, the lower part of which rests on the



FUNERAL URNS IN A MOUND AT CUILAPA

upper part of the loin cloth. The face is partly covered by a mask. The ears have the typical ornaments commonly seen in funeral urns. The head-dress is quite simple, its prominent feature being tasseled ears of corn placed above the forehead.

The fourth represents a seated man with bat-like head. The figure is clothed with a loin cloth, and has a band around the neck. The head-dress and objects in the hands are identical with those of the seated woman in the first urn of the series.

The fifth and last urn is a man sitting cross-legged, wearing a loin cloth and an elaborate cape similar to one discovered in Xoxo by the author. The mask and ear ornaments are similar

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to those seen in the third urn. The hands hold just in front of the chin a curious object, probably ceremonial in character, the lower part of which rests on the loin cloth. The head-dress is comparatively simple, and is backed by a line of upright feathers.

There is more variety in the urns of this series than in any of those discovered by the Loubat Expeditions, where in one series, shown on page 53, all five are exactly alike; in another



FUNERAL URNS IN THE FAÇADE OF TOMB 9, XOXO

four, and in a third series two of one form and three of another were found. This last series, shown on page 54, was found in a tomb at Xoxo fastened into the façade and is the only instance known where they were deposited in this manner.

As a class these funeral urns may be described as follows: They generally represent a human figure sitting cross-legged, although animal figures are not uncommon. They are, as a rule, hollow at the back, in the form of a cylinder. Sometimes the

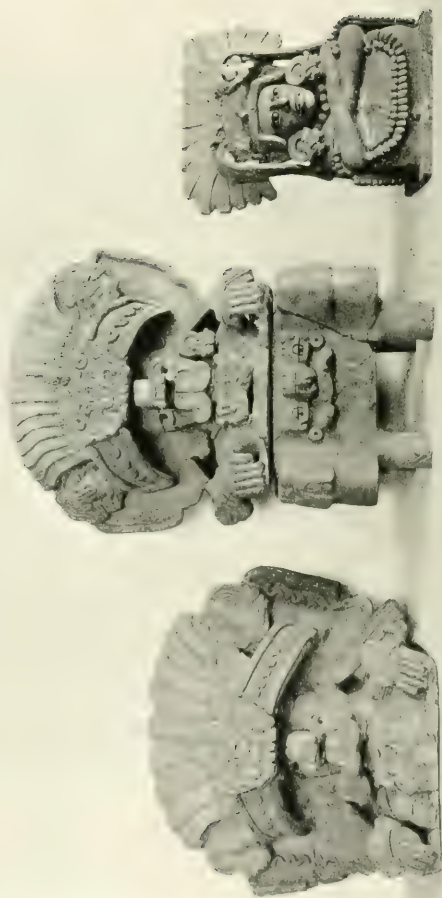
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arms are folded; again, the hands are placed on the breast or hold an object in front of the chest, but more often the hands are placed on the knees. In some instances the urns have been



FUNERAL URNS IN A NICHE IN THE FAÇADE OF A TOMB AT GUILAPA

mutilated at the time of deposit by knocking off one or both hands. The head is surmounted by an elaborate head-dress, the front of which almost invariably bears a symbol, such as the hieroglyph for water, a tiger's face, a bat, an owl or corn. Often



FUNERAL URNS FROM XOXO. THE TWO ON THE LEFT ARE SHOWN IN PLACE ON PAGE 54 THE BOX OF THE CENTRAL URN WAS FOUND ON THE FLOOR NEAR THE DOOR





22 TERRA-COTTA FUNERAL URN FOUND IN FRONT OF A TOMB AT CUILAPA

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the face is covered by a mask with prominent teeth and tongue, which seems to possess some of the elements of a tiger, but which more resembles the conventionalized serpent which is a common feature of Zapotecan sculptures and which is seen in so many of the Mayan sculptures. There are many urns which have a flat base, which serve as covers for boxes or chests. Some of these boxes have symbolic faces on the corners and front, and rest on four feet. Such urns are represented in the central figure on page 56, and by the lower figure of page 57, which is a simple box without decoration.

These urns are interesting, furthermore, for the personal ornaments represented, including various forms of ear ornaments, necklaces of stone and shell, beads and breast ornaments in the form of human heads and hieroglyphs. Where no mask covers the face the teeth are in many instances filed, a custom of decoration which prevailed extensively in Mexico and Central America.

The garments shown are capes, shirts, skirts and loin cloths. The figures are usually painted red. The specimen shown on page 58 is one of the largest known and was found in 1902 by the Loubat Expedition in front of a tomb at Cuilapa. It is two feet, three and three-quarters inches in height, and shows traces of four colors, namely: white, yellow, red and blue, being the colors of the four cardinal points.

It is probable that these urns represent deities, and that they were placed near the tombs to guide the spirits of the deceased on their journey to the other world.

According to early accounts regarding the customs of the Zapotecan Indians, which have been verified by the explorations of the Loubat Expeditions, their funeral ceremonies were as follows: When an important person died, the body was placed in a stone chamber, dressed, and with various personal ornaments and objects belonging to the deceased. Food and drink were placed in or near the tomb to sustain the deceased on his journey to the other world. Once a year, for four years, his friends came to the tomb and made fresh offerings of food and drink. At the expiration of this time the flesh had decayed. Sometimes then the

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bones were gathered together and placed in niches, but sometimes they were allowed to remain on the floor. Often they were painted red. In some instances the metate and hand stone for grinding corn and the clay griddle for baking the tortillas or corn-cakes were placed in the chamber, with numerous incense burners. Then the door was sealed with a large stone, and usually objects of value, such as personal ornaments and mosaics, were thrown into the space in front of the vault. Probably some of the offerings of food, drink and incense were intended for the deities whose effigies (the funeral urns) were placed near by. A mound of earth, adobe bricks and stones was raised over the structure and sometimes covered with a dome of cement.

MARSHALL H. SAVILLE.



THE Guide-Leaflet, "Primitive Art," which accompanies this number of the JOURNAL, is a comparative treatment of the collections in some of the halls of the Department of Ethnology. The material illustrating the decorative art of the Indians, the Eskimo and other native tribes of North America and eastern Asia is very full, and the Leaflet is intended for use both as a résumé of the subject and as a general introduction to the exhaustive study which may be carried on by means of the collections and with the aid of the literature to which reference is made in the bibliography printed at the end of the text.

THE GIANT SPIDER CRAB FROM THE JAPANESE SEAS.

The following note in regard to the size of the Giant Spider Crab from the Japanese Seas has been communicated by Geheimer Hofrath Dr. A. B. Meyer, director of the Royal Zoological Museum, Dresden, who is a Life Member of the Museum.

"On page 25 *antea* the size of the fine specimen of the Giant Spider Crab in the Department of Invertebrate Zoology (figured) has been given at somewhat more than 12 feet between the tips

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of its outstretched claws. The Dresden Museum having just received a specimen from the Sagami Sea measuring only 10 feet 8 inches, of which Prof. I. Ijima of Tokyo, who sent it, wrote that 'it is about the largest that usually come up,' I asked him what he knew of larger specimens. He answered: 'You may safely consider the Dresden specimen as one of the largest that can be obtained nowadays. Larger ones may possibly turn up, but that would be quite exceptional.' The specimen in the American Museum of Natural History, therefore, appears to be unusually large. The notice (*l. c.* page 26), that one in the British Museum 'has a spread of 18 feet,' is unfounded, Dr. F. A. Bather of that Museum stating on my inquiry, that their 'largest measures only 9 feet 4 inches from tip to tip of the two largest legs stretched out across the carapace.' I, therefore, do not doubt that the record of a specimen with a spread of 22 feet (*l. c.* page 26) is fabulous.

"DRESDEN, April 27, 1904.

"(Signed)

A. B. MEYER."

Remeasurement of our specimen gives 11 feet 8 inches as the distance from tip to tip of the outstretched legs across the carapace, which still leaves it the largest reported yet from any museum. It seems unlikely that the spread much exceeded 12 feet when the animal was alive.

MUSEUM NOTES.



URING April and May a series of lectures was given by officers of the scientific staff of the Museum. The subjects are given in the following list, and the lectures, which were illustrated by means of the stereopticon and specimens from the Museum collections, were adapted to the needs of boys and girls ranging from ten to sixteen years of age, and were especially designed for those who spend a portion of the year at the seashore or in the country. Many adults, members of the

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Museum and their friends, attended the lectures and seemed to find as much to interest them as did the young people.

April 16.—“Ants, Bees and Wasps,” by Dr. WILLIAM MORTON WHEELER.

April 23.—“Sea Beach at Ebb Tide,” by Mr. GEORGE H. SHERWOOD.

April 30.—“How to Study the Reptiles,” by Dr. HERMON C. BUMPUS.

May 7.—“Some Common Rocks and What They Mean,” by Dr. EDMUND OTIS HOVEY.

May 14.—“The American Indians and How They Live,” by Dr. LIVINGSTON FARRAND.

May 21.—“The Home Life of Birds,” by Mr. WILLIAM DUTCHER, Chairman of National Committee of Audubon Societies.

MR. FRANK M. CHAPMAN, Associate Curator of Mammalogy and Ornithology, spent the months of April, May and June in Florida and the Bahamas hunting for Paroquets, Flamingoes and other birds and their nests to complete the Museum's series of several forms. Before leaving Florida for Nassau, Mr. Chapman wrote as follows:

“Let me now report briefly on the results of my Paroquet reconnaissance. I took the steamer at Kissimmee April 12 and reached Bassinger, at the end of the line, the 14th. Frequent stops and opportunities to converse with natives showed that the Paroquet is practically extinct throughout the Kissimmee River region. From Bassinger we rode 20 miles south to Taylor Creek and camped on the border of the Okeechokee marsh, six miles, by the creek, from the Lake. Mosquitoes were more numerous here than I have ever before found them. We camped here seven days and I explored the region as well as I could in that limited time. All reports showed that Paroquets were as common there as they are known to be anywhere, nevertheless, I saw only two small flocks, one of four the other of eight birds. The first passed our tent about five o'clock one morning The second betrayed its presence by a single cry from a dense

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palm 'hammock,' where I eventually found the birds feeding on wild mulberries.

"No one has ever seen a Paroquet's nest, and the lack of exact knowledge of their breeding date and habits, in connection with their rarity, makes it exceedingly improbable that the nest will ever be found."

IN May, Professor William Morton Wheeler, Curator of Invertebrate Zoölogy, and Dr. B. E. Dahlgren, Curator of the Department of Installation, joined Mr. Chapman in the Bahamas, where they will collect marine invertebrates.

THE Department of Geology made, by invitation, an exhibit of publications and Martinique photographs at the Exposition of Progress in Geology which was held at the Muséum d'Histoire Naturelle in Paris in April.

THE meetings of the New York Academy of Sciences and the other scientific bodies which make the Museum their home were continued to the latter part of May, when they ceased for the summer. In October the meetings will be resumed, and announcements in regard to them will be made from week to week in the "Weekly Science Bulletin" of the Scientific Alliance of the city, which is to make its first appearance in the fall. The new Bulletin, in addition to announcements of meetings, will contain notices of new exhibits or new features of interest at this Museum and at the Botanical Garden in Bronx Park.

THE Annual Report of the President of the Museum was issued as usual in May. As indicating the general character of the Report, its concluding paragraph may be quoted in full:

"In conclusion I would say that the essential features that have characterized the year 1903 have been the addition of many new names to our list of members, the extension of our educational work through lectures and circulating collections, the enlargement of our building, the increase in the personnel of the scientific staff and the scientific researches and announcements that have resulted from our exploring expeditions."

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DURING the spring there has been in operation at the east end of the Entomological Hall (Hall No. 307) an exhibit which has attracted much attention, particularly from children, who have been visiting the Museum in great numbers. The exhibit consists of an observation beehive, which is attached to the window in such a way as to allow the busy inhabitants free ingress and egress, without permitting them to fly about the hall. The hive is provided with glass sides, which ordinarily are covered with wooden panels. When it is desired to see the bees at their work of completing the combs and filling the cells with honey, the wooden panels may be removed. Supplementing the hive, there is a display in a neighboring case which shows in detail all the different stages in the natural manufacture of honey and wax, and a series of different kinds of bees. The Bee-Moth also is shown and a section of a comb which shows the destructive work of this pest.

THE Museum's collection of archæological material from the Dakotas has been enriched by a series of shell rings, which has come as a gift from A. C. Farrell of North Dakota. These rings were used as ornaments and were found around the neck of one of three skeletons which were exhumed together from a mound on top of Turtle Mountain, near Dunleith, North Dakota.

PROFESSOR H. F. OSBORN is spending the summer abroad, chiefly in Italy and England. He will represent the Museum and the New York Zoölogical Park at the International Zoölogical Congress, which is to be held at Berne, Switzerland, in August, where he is to lecture upon the recent palæontological discoveries in the Rocky Mountain regions which have led to new conjectures as to the phylogeny of several families of mammals. At Cambridge, England, he is to lecture upon the Evolution of the Horse, giving the principal results of the investigations which have been carried on by the Museum under the William C. Whitney Fund.

PROFESSOR BASHFORD DEAN, Honorary Curator of Fishes, is likewise to represent the Museum at the International Zoological Congress in Berne.

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PROFESSOR FRANZ BOAZ went to Germany in May to spend the summer. He will make comparative studies in ethnology for the Museum, and will be one of the delegates of the Museum to the Congress of Americanists which convenes at Stuttgart, Germany, in August.

PROFESSOR MARSHALL H. SAVILLE leaves for Germany in July, and will represent the Museum at the Congress of Americanists. Professor Saville was General Secretary of the Congress when it met at the Museum two years ago.

PROFESSORS BOAS and Saville have been appointed by the Hon. John Hay, Secretary of State, delegates to represent the United States Government at the Congress of Americanists.

MR. W. JOCHELSON has finished his study of the collections which he made for the Museum under the Jesup North Pacific Expedition, and has gone to Europe, where he will continue his work upon his reports for the Museum by making comparative studies upon the Siberian material in other collections. He and Mr. W. Bogoras will also be present at the Congress of Americanists. Mr. Bogoras finished his studies upon the Jesup North Pacific Expedition material at the Museum some months ago, and went to Europe to continue his investigations for the Museum upon material in collections there for the completion of his reports.

IN the Library there has been installed the most complete obtainable set of cards from the Concilium Bibliographicum of Zurich, where it can be conveniently utilized by students. This card reference catalogue comprises about 95,000 cards (titles), covering publications in the departments of general biology, zoölogy, palæontology and microscopy.

THE Department of Vertebrate Palæontology has three expeditions in the field this season. Mr. Walter Granger is continuing the exploration of the Eocene Bad Lands in southwestern Wyoming, where much success was had last year. The particular objects of the expedition are to obtain material needed

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to mount a complete skeleton of one of the huge Uintatheres, and to illustrate more fully early stages in the evolution of the Horse, the Camel, the Tapir and other animals. Mr. Barnum Brown is at work in the Cretaceous beds of South Dakota and Montana, from which he has obtained in the past three years excellent specimens of Carnivorous and Horned Dinosaurs, Plesiosaurs, Mosasaurs and other extinct groups of reptiles. Last year Mr. Brown obtained rich and varied fossil fauna of Pleistocene age from caves and fissures in northern Arkansas. This season he will continue these investigations in the hope of obtaining additional new material. He will also make prospecting trips, in several promising localities, for fossil mammals and reptiles. Mr. Albert Thomson will search in the Big Badlands of South Dakota, especially for the little known Lower Oligocene stages of evolution of the Horses, Tapirs, Rhinoceroses and other animals of that epoch.

A NEW case of much interest, containing the skeletons of the Horse and Man, has been placed in the Evolution of the Horse Alcove in the Fossil Mammal Hall. This exhibit, the gift of the late W. C. Whitney, is designed to illustrate the latest stage in the development of the Horse and the close association of the animal with man. The study represents the horse as rearing to his full height, the man running beside him and controlling him with a halter. It is faithfully worked out from instantaneous photographs, and is suggestive of the breaking and training of the Horse by Man. It likewise illustrates the resemblances and differences in the two skeletons. Their nearly similar position makes it easy to compare corresponding parts, and to see the original identity in plan and structure, and the changes that have been brought about in adaptation to different modes of motion and habits of life in the horse and in man. The skeletons were prepared and mounted by Mr. S. H. Chubb, and are quite exceptional in the design and finish of the mountings as well as in the scientific accuracy of the poses.

THE Museum's collection of Auduboniana was enriched in May by the acquisition of an unpublished painting by the great

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naturalist. The scene represents a pair of the White-throated Thrush perched upon a branch of dogwood. The painting is the gift of John R. Livermore, Esq., of this city.

THE alterations which have been in progress for several months in the central portion of the building have been finished. These consisted of the formation of an entrance hall to take the place which was occupied for several years by the large lecture hall of the Museum, and the cutting of passageways through the basement underneath this new entrance way in such a manner as to permit of easy communication between all parts of the cellar, an important factor in the economical handling of the material which is in storage, or is in use in various laboratories. The new entrance hall is oval in shape and the walls are adorned with busts of eighteen American men of science. From the new entrance hall the visitor can go at will to any of the exhibition halls on the ground floor or to the elevators. One of the improvements affected during these alterations has been the construction of two small assembly rooms which will be utilized for classes which come to the Museum with their teachers, and for meetings of the various scientific societies which make the Museum their home.

MR. WILLIAM BEUTENMÜLLER, Curator of Entomology, went to North Carolina in May on a collecting trip in the Black Mountains. This expedition was made possible by the generosity of Mr. S. V. Hoffman, and is in continuation of the entomological survey of the Black Mountain region which has been carried on for some years by Mr. Beutenmüller under grants from the late Very Reverend E. A. Hoffman, D.D., LL.D.

THE Department of Archæology has received a collection of more than two hundred pre-historic shell implements from the island of Barbados. These consist of hatchets, chisels and similar tools from all parts of the island, and mostly made from the shell of the large conch, *Strombus gigas*. Such celts are peculiar to Barbados. Only two stone implements are in the

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lot, both of which are of material foreign to the island. All stages of manufacture are shown in this interesting series of shell implements.

THE Eighth International Geographic Congress is to be held in this country in September. The sessions begin in Washington, September 8th, and continue in Philadelphia, New York, Niagara Falls and Chicago, and close in St. Louis on the 20th. The Congress, while in New York from the 13th to the 15th of September, will hold its sessions in the Museum.

PROFESSORS ALBERT S. BICKMORE and Franz Boas and Dr. E. O. Hovey have been appointed delegates to represent the Museum at the Geographic Congress.

THE Department of Conchology has received as a gift from F. A. Constable, Esq., a noteworthy collection of Hirase shells from Japan. The collection was made by Mr. Hirase himself, which is a guarantee of its uniform excellence. The specimens comprise land, fresh-water and brackish-water forms, and represent a total of 357 species. This collection illustrates in part the new genera and species which Dr. Pillsbry of Philadelphia has recently founded on Japanese shells.

AMERICAN MUSEUM OF NATURAL HISTORY

Primitive Art



SUPPLEMENT TO AMERICAN MUSEUM JOURNAL
VOL. IV, No. 3, JULY, 1904
Guide Leaflet No. 15

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THE AMERICAN MUSEUM OF NATURAL HISTORY was established in 1869 to promote the Natural Sciences and to diffuse a general knowledge of them among the people, and it is in cordial coöperation with all similar institutions throughout the world. The Museum authorities are dependent upon private subscriptions and the dues from members for procuring needed additions to the collections and for carrying on explorations in America and other parts of the world.

The membership fees are,

Annual Members	\$ 10	Fellows	\$ 500
Life Members	100	Patrons	1000

All money received from membership fees is used for increasing the collections, and for developing the educational work of the Museum.

The Museum is open free to the public on Wednesdays, Thursdays, Fridays, Saturdays, and Sundays. Admission is free to Members every day.

Primitive Art.

A Guide Leaflet to Collections
in the
American Museum of Natural History.



GUIDE LEAFLET No. 15.

SUPPLEMENT TO THE AMERICAN MUSEUM JOURNAL.

VOLUME IV, No. 3, July, 1904.

Published by the Museum.



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INTRODUCTORY NOTE.

A VISIT to the ethnological halls of the Museum shows that the primitive tribes whose manufactures are exhibited in the cases delight in ornamenting all the objects which are used in ordinary life, in festivals and in sacred ceremonials. Many of the ornaments may seem crude to our taste, but undoubtedly they are applied to the objects for the same purpose as that for which we apply decorative ornamentation.

Studies of the forms of primitive decoration, which have been carried on by many students, demonstrate the fact that almost everywhere decorative designs, no matter how simple their forms may be, are significant. In many cases we find animal forms and plant forms used for decorative purposes, and in these the significance is at once given by the design. In other cases the ornament consists of nothing but geometrical elements, such as straight lines, triangles and rectangles, or curves and spirals. These designs also are interpreted by primitive man as representing certain natural forms, and thus they express definite ideas.

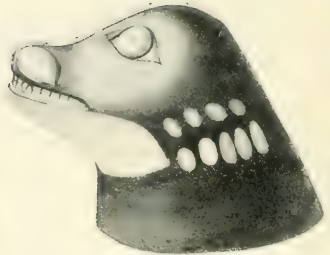
It may therefore be said that most primitive decoration is symbolic. The style of decoration by means of which ideas are expressed differs very much in various parts of the world. The groups of ideas that are expressed by ornamental designs are also different, according to the characteristic culture of each tribe.

The collections to which this Leaflet refers may be found in Halls 108, 102 and 202. Their location in the halls is marked on the accompanying plans.





DYING WARRIOR



SEA L.



BEAVER



PUFFIN



KILLER-WHALE



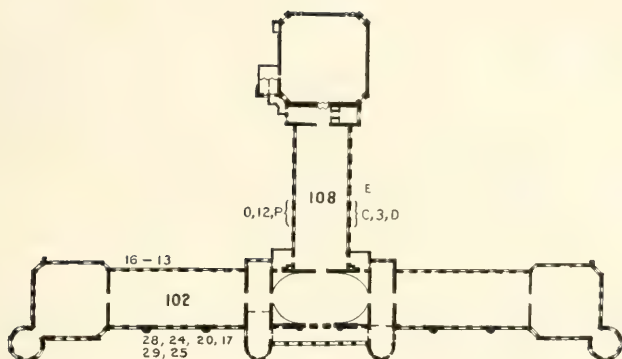
SCULPIN



DOG-FISH



SQUID



FIRST FLOOR, HALL 108.

CASES C, D AND 3.

THE COAST TRIBES OF ALASKA AND BRITISH COLUMBIA.—These tribes use throughout animal forms for purposes of decoration. Some of their masks show that they have the power of producing good realistic representations of human and animal forms (Case C 12); but more frequently the characteristic forms of the animal to be represented are exaggerated in size, as, for instance, the beak of the hawk and the incisors of the beaver.

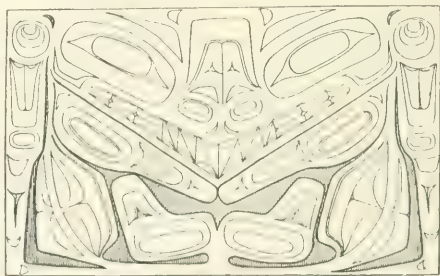
Sometimes the characteristic feature is represented alone, and thus becomes the symbol of the animal. In Case 3 c the symbols of several animals are exhibited. The beaver, which is shown in the upper right-hand corner, is characterized by two large incisors, by a broad tail on which scales are indicated by means of hachure and sometimes by the stick which it holds in its paws. The killer-whale is symbolized by its long dorsal fin; the shark or dog-fish, by its long, pointed snout, which is represented as rising over its forehead, by its large mouth with depressed corners and many teeth and by the gill-lines which appear on its cheeks. The sculpin is symbolized by spines which rise over its mouth; the eagle, by its crooked beak; the squid, by the suckers which

appear attached to the eyebrows or to other parts of the body; the raven, by its long beak; the sea-monster, by its large head and by flippers attached to its elbows.



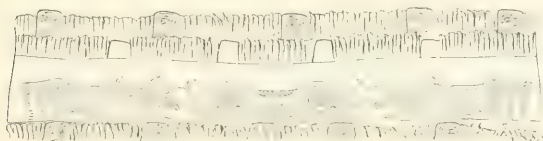
The method of distorting the animal form in order to make it fit the decorative field is illustrated in the specimens in Case C 13. The decorated wooden dish in the bottom of the case represents an animal. It is so shown that the front of the dish represents the animal's head; the sides of the dish, the sides of the body; while the narrow end in the rear represents the tail.

Thus it will be seen that the dish actually represents the body of the animal hollowed out from the back. The animal forms are placed in a similar manner on painted hats, as on the one here illustrated; the whole animal being laid around the conical hat, and, as it were, being pulled over the head. In some cases the adaptations require material changes in the form of the animal. When, for instance, a fish is to be painted or carved on the front of a square box, the body of the fish must be so distorted as to fill as nearly as possible the whole decorative field. This is done by cutting the fish along its whole back from head to tail, by exaggerating the size of the head, twisting half of the body along each side of the decorative field and placing the tail so that its



end comes just under the head. In still other cases the form of the decorative field necessitates great reduction in the size of certain

parts of the body. Thus we find in Case 3c a blanket-border representing a sea-monster. The animal is shown split in two along its back; but all its parts — except its head, the paws and the tail — are much reduced in size. The teeth are indicated by



a series of slanting lines under each eye, but the lower jaw has been omitted. The body is represented by a fine line extending from the lower outer corners of the eye, around, then along the upper margins and finally down again. The arms and the fins, which are believed to be attached to the elbows of the monster, are of very small size, while the paw is painted on a very large scale. The wide strips in the fringe represent the dorsal fins of the mon-



ster. This reduction of parts of the body has evidently given rise to the elimination of all except the characteristic symbols, whenever this was necessary. We find a similar reduction of the sea-monster design on a bracelet in Case C 13, the design of which is shown above, and the complete omission of parts of the body on another bracelet representing the eagle, of which only head, talons and wings are shown.

Sometimes, in the effort to bring the animal form into the decorative field, the animal is dissected and distorted in a most astonishing manner. This is particularly true in the case of the large ceremonial blankets woven by these tribes, in which various parts of the animal body seem to be combined in the most irregular manner, although really each part represents a definite portion of the animal represented. The blanket above Case D 3 and the explanatory model in that section illustrate this dissection. Similar distortions occur in paintings. For instance, in the copy of a painting from a house-front (Case D 3), representing the killer-



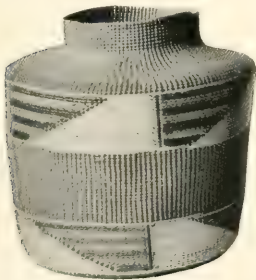
whale, the central part of the figure represents the head of the whale. The flippers are shown close to the corners of the jaws, half of the blow-hole and half of the dorsal fin in the right and left hand upper corners, while the tail is shown just over the head.

A collection of designs representing various animals, indicated by their symbols and distorted so as to fit the decorative field, is shown in the exhibition cases. The lower part of Case 3 *c* contains representations of the dog-fish or shark. Case 3 *b* contains representations of a mythical sea-monster. In Case D 1 the sea-lion, sculpin, raven, crane, frog and seal are shown. Case D 2 contains representations of the beaver, all of which are characterized by the large incisors and the tail with hachure. Case D 3 contains representations of the killer-whale, characterized by

the long dorsal fin; D 4, representations of the bear, which is characterized by its large mouth, often represented with protruding tongue, and its large paws; D 5, those of the raven; D 6, those of the thunder-bird or hawk and the eagle, the thunder-bird being characterized by the hooked beak, which turns back into the mouth.

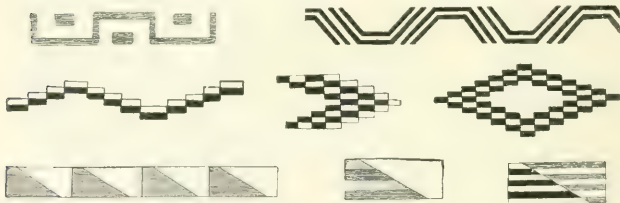
One of the peculiar characteristics of the decorative art of the North Pacific coast is the frequent occurrence of the "eye." A form similar to an eye, consisting of an inner and an outer circle, is applied to indicate all joints, evidently to signify the socket and the head moving in the socket. Often this eye is elaborated as a whole face, which then makes the interpretation of the animal form very difficult.

The essential features of the decorative art of the coast Indians of Alaska and British Columbia may thus be characterized as a representation of animal forms by means of distortion and omission, the decorative forms being somewhat realistic representations of parts of the body, preference being given to those parts which are symbolic of each animal.



Purely geometrical decoration is found in only one place on the North Pacific coast. It is applied to the basketry of the Tlingit Indians (Case E 3-8), who, however, in their painting and carving, use the style of art described before. This geometrical style was probably developed in imitation of the porcupine-em-

broidery of the tribes of the interior. Most of the ornamented baskets are made of spruce-root, and are embroidered with grass. The ornaments are generally arranged in two broad parallel stripes of the same design, separated by a narrow band containing a different design. The motives consist of rectangular and triangular forms. The people interpret each motive as the representation of some realistic object. The meander pattern is interpreted as waves and as objects floating in the waves, while a similar design executed in obtuse angles is interpreted as the



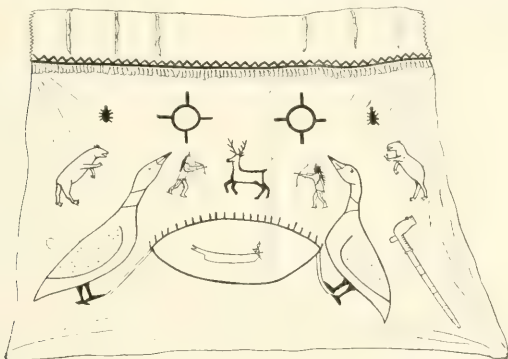
butterfly. Diagonal rows of small rectangles are interpreted as a string tied around the basket, while two such lines meeting in a point are interpreted as flying geese; and a diamond made up in a similar way represents goose-tracks. Rectangles divided diagonally into two sections are interpreted as bear's feet, one half representing the sole of the foot, while lines in the other indicate the claws. In many cases, both the design and the figure cut out of the background are given names.

It is important to note that the interpretations given to the designs on some baskets seem to be entirely disconnected. This suggests that the combination of the patterns has no distinct symbolic significance, but that the so-called "interpretations" are rather pattern-names.

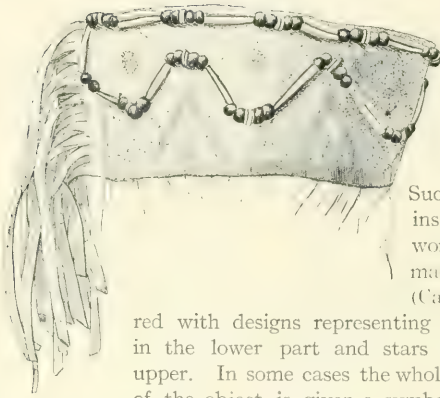


CASES O, 12 AND P

COAST TRIBES OF WASHINGTON AND TRIBES OF THE INTERIOR OF BRITISH COLUMBIA.—The general character of the decorative art of this region is entirely different from that of the coast tribes of Alaska described before. The ornamentation applied by the tribes of the interior to their garments and to objects of every-day use is throughout pictographic; that is to say, it consists of realistic representations of natural objects, which are connected, and tell a complete story. We notice, for instance, on a painted blanket



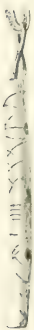
in Case 12 *f*, a number of animal and human figures. A mountain-range rising on the earth is shown above the fringe. On the upper part of the blanket, two suns are shown, outside of which are two beetles. In the center is a stag pursued by two Indians. The figures near the right and left margins are grizzly bears. On the lower part of the blanket two loons are shown. These are painted on a large scale because they are the guardian spirits of the wearer. Between them there is a lake with trees around one side, and a canoe and a man in the center. Trail-lines between the loons indicate that they belong to the lake. The owner's pipe is painted on the lower right-hand corner. The idea expressed by these figures is a prayer for success in hunting on mountain and lake. The hunters and the canoe-man represent the wearer of the blanket; the suns, beetles and loons are his guardian spirits.



In many cases these pictographs become more geometrical in character, so that they may be called ornamental designs.

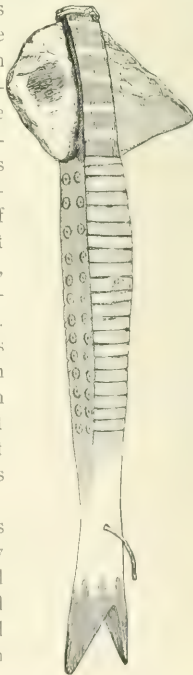
Such is the case, for instance, in a young woman's head-band made of buckskin (Case 12 *d*), painted

red with designs representing lodges in the lower part and stars in the upper. In some cases the whole form of the object is given a symbolic interpretation. Thus we find a stone war-axe (Case 12 *e*) representing the woodpecker. This design symbolizes the idea that the point of the axe is to be as powerful in piercing skulls as the beak of the woodpecker is in piercing the bark of trees. The point of the axe represents the beak of the bird; the red dot on the rounded part of the stone, its eye; the handle, its body. In the pictographic art of this tribe, certain motives have obtained a conventional meaning.

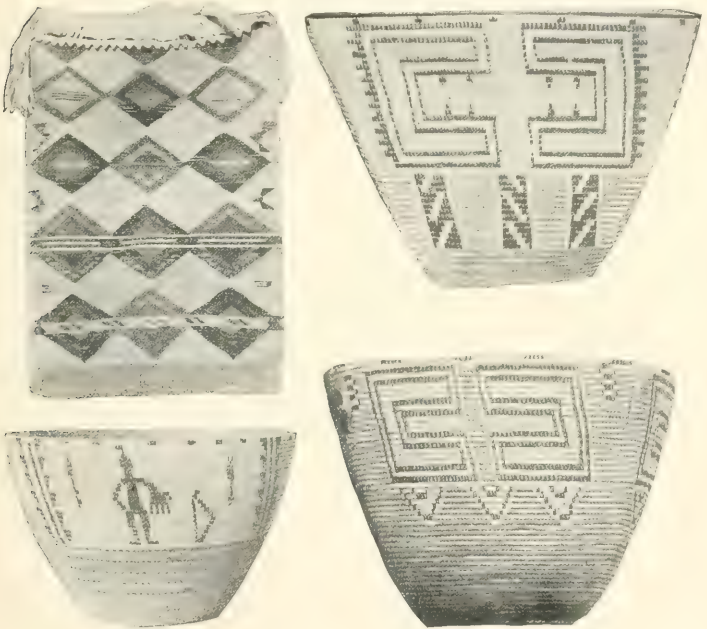


Such is the case, for instance, with the triangles on the girl's head-band mentioned before, which always represent lodges. Crosses, like those on the drinking-tubes in Case 12 *d*, represent the crossings of trails; parallel lines represent ditches, and a circle with four equidistant rays symbolizes the sun.

The pictographic art of these tribes tends to assume a geometrical character particularly on their woven bags and on their imbricated basketry. The merging of the pictographic and purely decorative elements may be observed very clearly in a bag (Case 12 *d*), on which

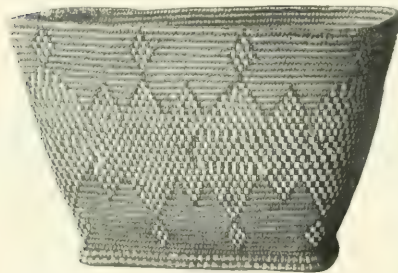


a series of diamonds represents isolated lakes, and lakes connected by streams. Near these lakes are shown ducks flying towards the water. Designs half pictographic and half geometrical may also be seen on the baskets in Case O 9, in which the figures of birds, men and dogs may be recognized. A



striking interpretation is given for two baskets in Case O 11. The peculiar rectangular forms which face each other are each interpreted as a head. In one of these, the short lines on the back represent the hair, while the two pairs in each opening represent teeth. In the other one these attachments have entirely disappeared, but the form is still interpreted as that of two heads facing each other.

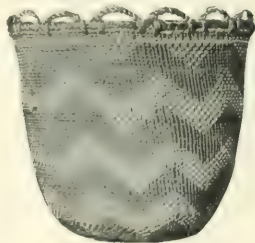
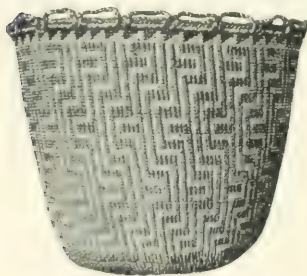
A great variety of geometrical forms may be observed in these baskets (Case P 1-3). Almost all of them are also given realistic



interpretations. One interesting basket, the design of which consists of alternating large and small diamonds, is explained as the beaver design, the large central pattern being interpreted as the body of the beaver; the small diamonds at the lower end, its

tail; the one at its upper end, the head; while the black lines forming one side of the intermediate diamond are the fore and hind legs of the animal.

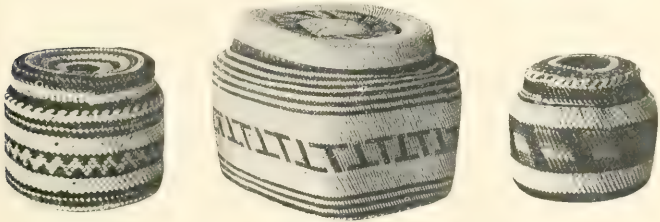
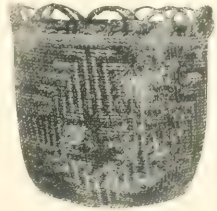
It is fairly evident that this type of basketry has influenced that of the coast tribes of Washington, who also have geometrical designs on their baskets. We find among these tribes a good many baskets imported from the interior, while their own baskets



show a different type of manufacture, but somewhat similar designs. Here a meandering pattern is interpreted as ripples of water, while a design consisting of zigzags is interpreted as mountains and valleys (Case O 7). Attention is called to the peculiar designs composed of hooks (Case O 8), which will be

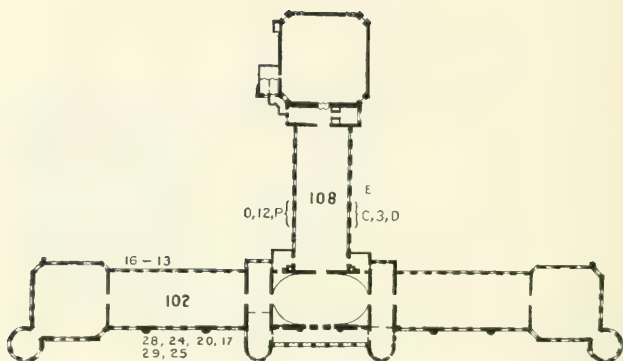
referred to in the description of Californian designs. These designs also occur in the basketry from the interior of the State of Washington (Case R 12).

The forms which we observe on the coast of Washington have also influenced the type of basketry of the tribe of Cape Flattery, a branch of the Nootka, whose culture is similar to that of the more northern coast tribes. Among them we find many fine baskets with geometrical designs (Case N 10). These baskets are made on a foundation of cedar-bark, while the designs are executed in colored and bleached grass-stems. Most of the designs resemble in character the geometric designs of the southern coast tribes. It is, however, peculiar to



this tribe, that on some of these baskets, whaling and fishing scenes, with canoes and their crew, are represented. Such scenes were also used in the ornamentation of the old type of hats that were worn in the eighteenth century, but which have gone out of use.





FIRST FLOOR, HALL 102.

CASES 17-29

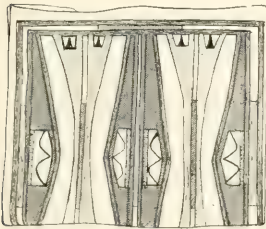
PLAINS INDIANS.—The decorative art of the Plains Indians resembles in some characteristic features that of the tribes of the interior of British Columbia, although its technique is much better and more elaborate. Its fundamental character is pictographic. In objects which serve ceremonial purposes, this character is strictly maintained. Thus we find on buffalo-hides which are records of events, and even on blankets, pictographic representations of battle-scenes, or of other events in the daily life of the Indian. On garments used in ceremonial dances, paintings occur which represent birds, sun and moon, and are similar in character to those described before.

These, however, are not, strictly speaking, decorative designs. In most cases where ornamentation is the prime object, the forms which are utilized are arranged more or less symmetrically; and with the development of symmetry we find that the occurrence of realistic forms disappears. Almost all the decorative work of the Indians of the Plains is made in bead-embroidery, and is

probably an outgrowth of the embroidery in porcupine-quills which was characteristic of the Indians before they came in contact with the whites. The forms which are the constituent elements of decorative motives are very simple and characteristic. They consist throughout of regularly arranged triangles and rectangles, mostly in brilliant and strongly contrasting colors, and often also showing sections of varying color. Sometimes the decoration is applied to the whole surface, sometimes only a particular part of the object is decorated. Much of the painting is done on rawhide, but most of the embroidery is made on soft skin. The background of the painting is usually rawhide, while the beaded designs are often set off against a background of white or colored beads.



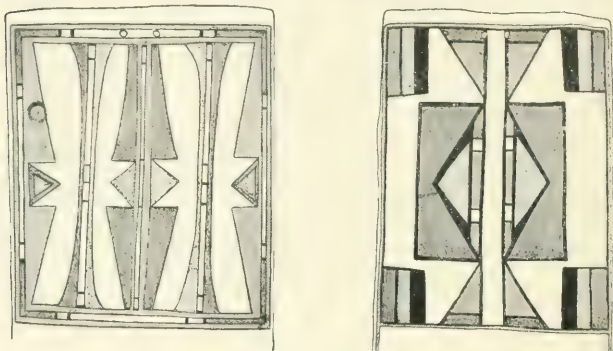
The manner of combination of triangles and rectangles is so peculiar, that decorated objects obtained from the Plains Indians can readily be distinguished from objects from any other part of the world. Although there is a certain sameness among all of them, each tribe has certain peculiarities of its own. The most characteristic form, which occurs over and over again in Indian decorative art, is the somewhat pointed triangle, either divided into halves of different color, or including another triangle of different color.



This form is generally explained as the tepee, the tent of the Plains Indians. Another form which is almost as frequent is a very obtuse triangle, often with a small rectangle in the middle. This is interpreted as a hill, while the center figure is often called a cave in the hill. We find also very often designs consisting of parallel lines,

sometimes broken up by equidistant short patterns of different color. These lines are generally interpreted as trails; and breaks in the lines, as camping-sites or other interruptions of the continuous trail.

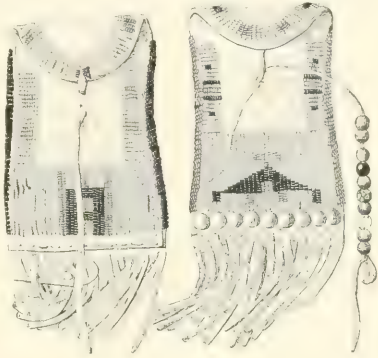
The decorative forms applied by the Indians may, on the whole, be described as a variety of combinations of the acute tent triangle and of the obtuse hill triangle with rectangles and straight



lines. Circles divided into sections occur also quite frequently. All these forms are executed in a variety of color, which is generally included in the symbolic interpretation of the design.

The detailed arrangement of the decorative motives shows some characteristic differences among different tribes. Thus, we find that the Arapaho (Case 20 *h*) like to arrange their patterns on hide bags in a number of parallel stripes, and that in the painted designs they put on the color in rather small areas. The Shoshone (Case 26 *e*), on the other hand, like to arrange the decorative field in such a way as to lay out a wide border which cuts out a central field. The designs in these areas are laid on in strongly contrasting colors, without leaving any white background to speak of. Similar differences may be observed in the bead-work of different tribes. Some — for instance, the Comanche (Case 26 *d*) — prefer to arrange their patterns in delicate narrow bands; while others, like the Sioux, utilize large beaded surfaces. These may be observed on moccasins, bags and pouches, on which white or colored beads form the background, from which the designs are set off. It seems, however, that some beaded and painted designs are common to all the tribes of the Great Plains.

Interpretation of Arapaho Designs.—The characteristics of Indian interpretations will best appear from a description of a few specimens. The square design near the lower edge of a small pouch (Case 20 e) is the bear's foot, generally conventionally represented by the Arapaho with only three claws. Square pink spots on the body of the design are the bare skin on the sole of the foot. The white bead-work is sand or soil. The curved band on the flap is a mountain. The leather fringe at the bottom of the pouch represents trees.



White beading on another pouch represents sand: the green beads at the edges, on account of their color, represent timber; two compressed crosses, the morning star; and squares on the flaps, rocks. The large figure near the bottom is a mountain with a tree on its summit. Below it are four small red and blue rectangles, which denote little streams flowing from a spring near the foot of the mountain. The spring is represented by a green square in the large triangle.

Paint-pouches amulets and head-ornaments are often given animal forms. The pouch illustrated here represents a lizard. The large ornament at about the middle of the bag represents a butterfly. The triangles are its wings, and the rhomboidal figure of bead-work projecting on the leather surface is its body. On the flap is the dragon-fly. The detached, somewhat triangular figures at the sides of the dragon-fly are its wings.

On an Arapaho moccasin (Case 20 *h*), a wide stripe embroidered on the instep represents the path on which the wearer travels. The two pieces of the transverse stripe, which duplicate in minia-

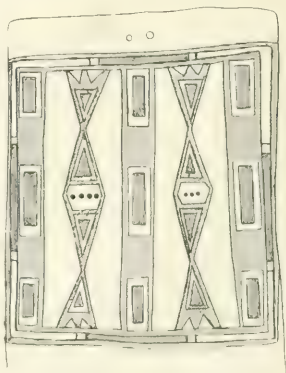


ture a part of the main stripe, are insects or worms which the wearer desires to avoid, and which, for this reason, are placed by the side of his path. The upper portion of the large stripe is light blue, which signifies, as in many other cases, haze. The red and dark-blue bands that edge the white portion of the stripe represent day and night. The winged triangle, which appears twice, signifies sunrise, and also the passage over a mountain.

The explanation of painted designs of the Arapaho is quite similar to that of beaded designs. Thus, on one hide bag (Case 19 *c*) three wide blue stripes represent rivers, both form and color being symbolic. The red rectangles in them are islands, and the white border around these is sand. The triangles are bears' feet; the red portions of the triangles represent the bare skin of the sole of the foot; the projections at the base of the triangles are the claws. The unpainted background represents the prairie; the black spots in them are coyotes. Blue lines enclosing the whole design are buffalo-paths; the white lines between them, antelope-paths; the yellow line is an elk-path; and red lines are deer-paths.

It will thus be seen that the interpretation of the designs given by the Arapaho is partly realistic, while a part of the designs express abstract ideas.

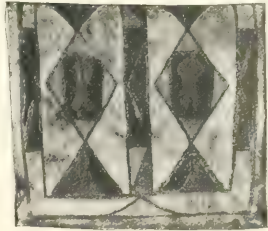
The morning star, the life symbol, the path of life and other concepts which are intimately associated with the religious ideas



of the people appear frequently in their interpretations of their designs. Purely animal forms are, comparatively speaking, rare; while geographical features,—such as mountains, valleys and rivers,—tents, parts of the body and plant designs occur very frequently.

CASE 17 c.

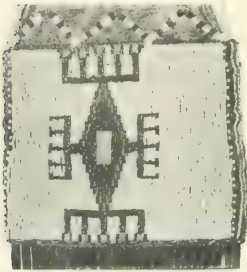
Interpretation of Blackfoot Designs.—Among the Blackfoot we find the same type of decorative designs as among the Arapaho, triangles and diamonds being the most important elements, but they are purely decorative, without symbolic significance. These geometric forms, however, have pattern-names as constituent elements of the complex designs, for example: the diamond-shaped figures are known as “spavin” patterns. The idea is, not that the design represents a “spavin,” but that it resembles this affection as it appears upon a horse’s foot.



CASES 24, 25.

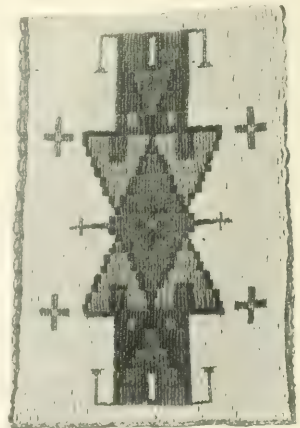
Interpretation of Sioux Designs.—The decorative art of the Siouan tribes comprises geometrical designs in bead-work, and pictographic designs in paintings. The geometric designs are both symbolic and decorative. The pictographic designs are usually symbolic. Most of the geometric designs are made by the women; the pictographic, by the men. The art of the women is especially interesting, because we find them using simple geometrical forms as design elements, for example: all triangular designs of a certain size are known as “tent” patterns; all rectangular designs are known as “bag” patterns; all small triangular designs are known as “point” patterns, or “leaf” patterns; diamond-shaped designs are known as “arrow-point” patterns. Complex geometrical designs are built up from these simple elements, and the names given above are the technical names for these designs. The complex designs are best represented in the decoration of tobacco-pouches, as illustrated in Case 25 a.

These complex designs, taken as a whole, often have special names, for example: a diamond-shaped figure with forked appendages, as shown in the adjoining illustration (Case 25*a*), is sometimes



spoken of as the "turtle" design, or "turtle" pattern. So far as the makers of these designs are concerned, the name "turtle" is simply the pattern-name, and in no wise a representation of the animal specified. Thus we have a series of decorative designs in which the motive is not the representation of objects or ideas, but merely an appeal to the æsthetic sense. However, these design elements may be combined into wholes which do

represent definite objects or ideas, and so become symbolic designs; but the use of designs to represent any particular idea does not conform to any rule, it depends rather upon the fancy of the maker. A good example of this type of design is illustrated below (Case 25 *a*). It represents a decoration seen by the maker in a dream. It is thus a picture of the dream design. But there are certain geometrical forms which are symbolic, and are looked upon as sacred. One of the most common of these designs is that of a spider-web, which may be seen on the pouch shown on p. 25 (Case 25 *c*). This design is looked upon as too sacred to be used for mere decorative purposes.



There is another type of design midway between the sacred symbolic one and the merely decorative one, such as the design of the turtle upon the dresses of women. This is simply a U-shaped figure placed on the breast

and the back. It appears on most of the beaded dresses, and is placed there partly for decoration, and partly because it is the prevailing style. The old women know that in former times the design of the turtle was placed on the dress as a kind of prayer to the mythical turtle, who was believed to be the guardian spirit watching over the lives of women. Now they say that the design is placed on the dress simply because "that is the way." Thus we have a design which was formerly sacred and symbolic, but is now chiefly decorative. The painted decorations upon the buffalo-robos of men and women are of this type also.



In general, the decorative art of the Sioux presents three types, or perhaps stages, in the development of primitive art, — a purely decorative type, a purely symbolic type and an intermediate conventional type. The men employ the same simple and combined geometrical designs as are used by the women, but for the presentation of military ideas. Thus, the moccasin (Case 24 g) shown here represents a battle in which the wearer participated. The triangular designs around the sole (the tent pattern) represent hills; the small rectangles (the box pattern), enemies standing between the hills; the small marks upon each hill design, bullets striking. The in-step of the moccasin is colored red to represent blood, and the triangular design within the red area represents an arrow. The idea

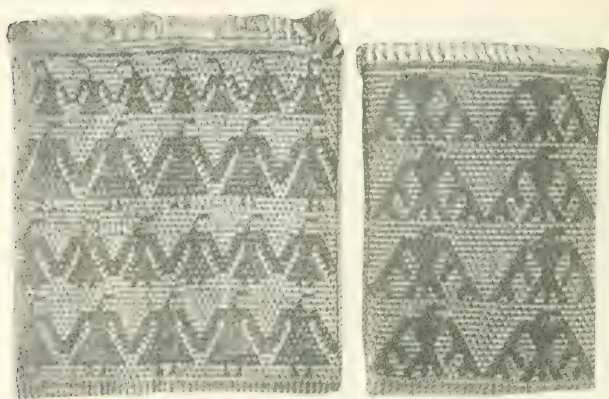
to be conveyed is, that the owner engaged in a battle in which the enemy took refuge in the hills, and that blood was shed.

Thus we have among the same people identical geometrical designs, with identical technical names, used to convey different ideas. The military symbolism of the men differs from the symbolism of the women in one respect, namely: that any one familiar with the mode of presentation can interpret the designs used by men with considerable exactness.

In a general way the interesting characteristic of Sioux art is the existence of two schools,—that of the women and that of the men,—each of which makes use of the same design elements, but to different ends.

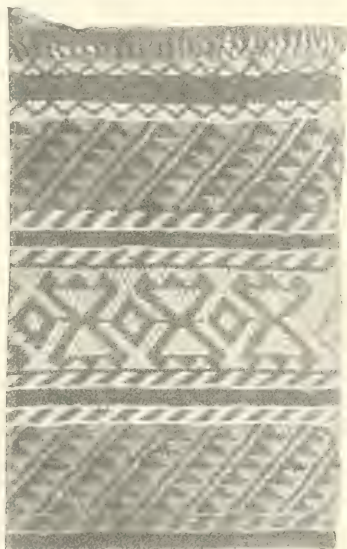
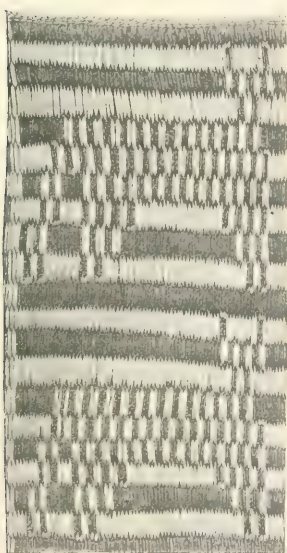
CASES 28, 29.

TRIBES OF THE EASTERN WOODLANDS.—Very little of the ancient art of the Indians of the eastern woodland area remains. Under the influence of modern patterns, the old style of porcupine-quill and bead-work has practically disappeared, and plant-



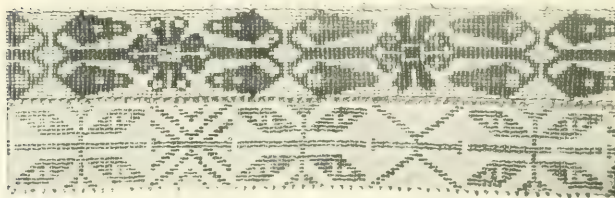
patterns have taken its place. Only on woven pouches and mats do some of the old patterns persist. These designs are partly of geometrical character; partly they consist of very stiff conventional reproductions of animal and human forms (Case 29 *a*). The favorite design seems to be that of a bird with spread wings,

the shape of which has also influenced the manner of representing the human form (Case 28 *e*). The geometric designs (Cases 28 *e*, 31) are mostly arranged in bands, and consist of triangles, zigzags and diamonds, which show only slight relation to those of the Indians of the Plains, while they remind us somewhat of the designs of the Indians of the State of Washington. We may perhaps recognize in some of the triangles with points under their bases the tent design so common



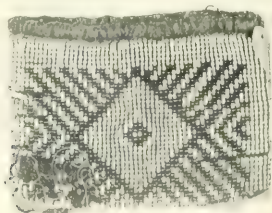
among the Plains Indians. The whole make-up, however, of the geometric forms is quite distinctive. If there ever has been any interpretation of these geometric designs, it seems to have been forgotten, and the designs are considered purely as ornamental, not as symbolic. The only striking exception is the same spider-web design that we find among the Sioux Indians, and which occurs here practically in the same form. (Case 28 *h*.)

Painted decorations are much rarer among these tribes than among those of the Great Plains. In place of the hide bags, which are so common among all the Prairie tribes, hide trunks



are used which are painted with patterns similar to those described before. Probably these hide trunks are modern forms of ancient bark boxes.

It is interesting to note that in the modern woven beadwork of these tribes the realistic flower designs which have been in vogue for a considerable period tend to assume geometrical shapes. The series of beaded belts exhibited in Case 28 *h* brings out clearly the fact that the leaves and fruits tend to assume the forms of diamonds, while the flowers tend to develop in the direction of crosses. The two beaded belts, illustrated above, show types of conventionalization of modern flower designs.





CASES 14, 16.

TRIBES OF THE AMUR RIVER.—The Gold, who inhabit the Upper Amur River, belong to Tungus stock, while the Gilyak of the Lower Amur River and of the Island of Saghalin form an independent group. The decorative art of these two tribes is almost identical. The fundamental forms are geometrical designs, consisting almost exclusively of spirals and of other curves,—a style of decoration widely spread in other parts of the Old World. In this particular region its occurrence is undoubtedly due to the influence of Chinese decorative art. The spiral ornaments are used in carving, in designs cut out of birch-bark and in embroidery. They are also applied in etched and inlaid ornaments on iron spears (Case 16 *a*). The most characteristic feature in



the elaboration of this motive is its combination with bird and fish designs. The cock particularly is a favorite pattern, and appears in combination with the spiral. On a fish-skin garment of the Gold may be seen a series of designs, at the top of

which is shown a crowing cock; other cocks are placed at the end of a horizontal band. On a birch-bark basket (Case 16 *e*) the same combination of designs appears very clearly, the curved ornament enclosing quite a number of cocks and fishes. Other

animals are not found as often as the two here named; but in a number of patterns exhibited in the turning-frame on the north wall of the hall, combinations of a variety of animals may be



found. In one of these, illustrated below, are represented four musk-deer (*a*), two frogs (*c*) and a number of fish (*b*).

While many of these forms are fairly realistic, in other cases the animal form is so highly conventionalized that it can be recog-



nized only because it is known to the natives as a symbol of the particular animal. Thus the spirals in a birch-bark basket (Case 16 *e*) are explained as two cocks which stand back to back; the point marked *a*, in the illustration beyond, being the beak of

the cock, while the oval (*c*) is an object which it is supposed to hold. This object is found in a great many representations of the cock, and may be said to be one of its prime characteristics. The tail of the cock has the form of a fish, and is shown at the point *b*. The center of the second set of spirals (*g*) has the form of a fish, which is always symbolized by a small circle attached to an elongated body.

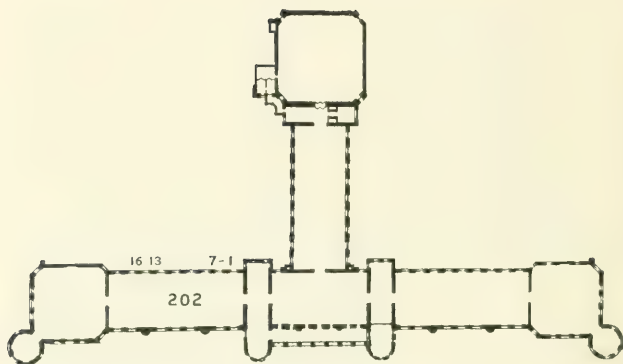
It is very peculiar that practically all the spirals and curved designs of these tribes have been developed into the cock motive, because the cock was not known to the tribes of the Amur River until quite recently. The use of this motive, and particularly also the frequent occurrence of the round object which is in its beak, indicates



that this motive is of foreign origin. It is evidently the same as the cock in China which holds the sun in its beak.

It is interesting to note that, among this tribe also, the form and ornamentation of objects used in religious ceremonials are much more realistic than purely decorative motives. Thus we find the coat of a shaman (Case 14 *c*), on which is painted a mythological representation of the world-tree, representing the conception of the world that is current among the tribe.

Going back through Hall 102, the visitor passes the Eskimo collections, and attention is called to the fact that very few implements and objects made by the Eskimo are decorated, except their clothing, which bears designs of dark and white caribou-skin.



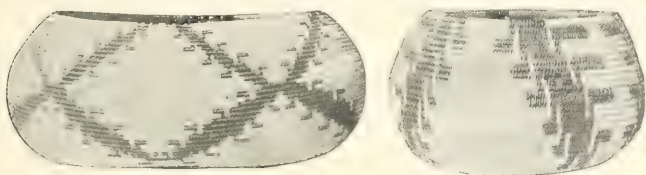
SECOND FLOOR, HALL 202.

On the second floor are found collections from California and Mexico which illustrate some of the characteristics of the decorative art of these regions.

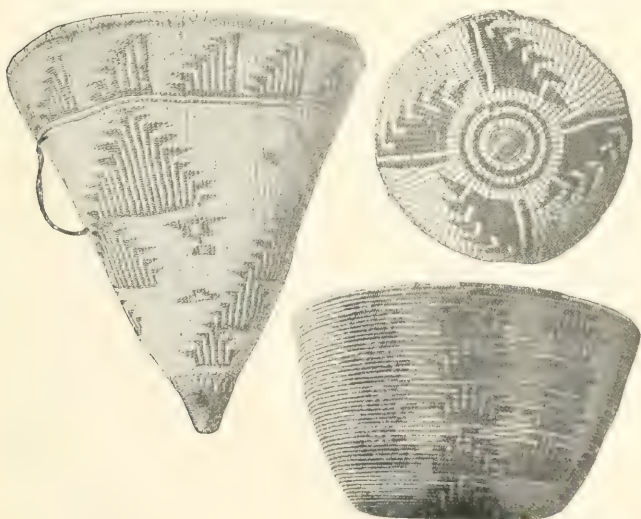
CASES 1-6.

CALIFORNIA INDIANS.—The decorative art of the California Indians, more particularly that of the Indians of southern California, is almost entirely confined to basketry. Their baskets are mostly round, rather rarely oblong, many of them quite shallow: consequently we find a tendency to arrange the decorative designs in radial groups or in spirals. The designs themselves are rarely realistic, but consist always of more or less intricate geometrical designs. The similarity of these designs on various baskets is quite striking. Their interpretations, however, differ considerably. A collection illustrating the similarity of design and the diversity of their meaning has been assembled in Case 2 *a, b*. There we find on one basket a design representing a squirrel's foot. A similar design on another basket represents mountains and pine-cones; on still another, the bear's foot; and on a fourth the owl's claw.

In the same case are shown a number of baskets illustrating one of the most common ornamental motives found in California,



the so-called "quail-tip," a design consisting of a slender line with a small heavy hook standing off from the end at right angles. This design was described before as found on baskets from the State of



Washington (Case R 12 in Hall 108), and it seems probable that it has spread along the Pacific coast from tribe to tribe. This

seems the more likely, since it is found in entirely different weaves, according to the district in which it occurs. While it is found on many Californian weaves, it is applied in the State of Washington on the peculiar imbricated basketry the characteristic designs of which are illustrated by baskets of the Thompson and Lillooet Indians (see p. 15 and Cases O and P, Hall 108).

The interpretations given to designs by the Californian Indians vary greatly. The designs often represent plants, while some represent fish-teeth, snakes, worms, millepedes, butterflies, etc. Designs symbolic of larger animals are absent. One of the most frequently occurring designs on Californian, and perhaps on all basketry, is the feather and arrow-point design (Cases 2, 3). Realistic designs are found only in the extreme southern part of California and in the adjoining portions of Arizona.

In northern California the interpretation of designs seems to be almost absent. The patterns of this district are called "striped," "zigzag," etc., terms which are evidently names, not interpretations (Case 6 f).

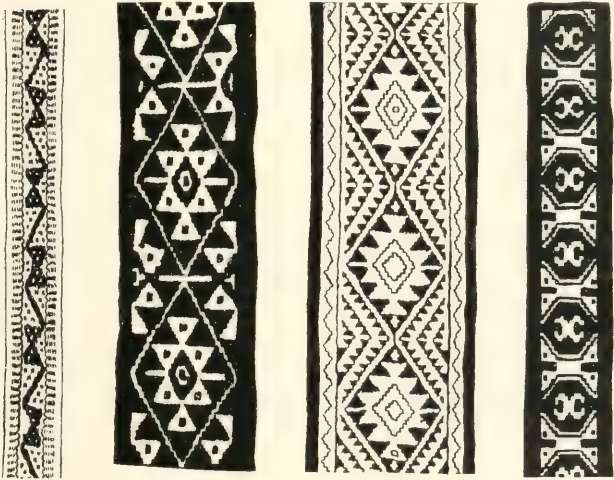
CASE 15.

HUICHOL INDIANS, MEXICO.—The decorative art of the modern tribes of Mexico has evidently been much influenced by Spanish art. The most elaborate decorative work of the present period is done in textiles, particularly in weaving and in embroidery, while modern pottery designs are of a crude character. The designs found in various regions of Mexico and of Central America, and also those of South America, consist to a great extent of geometrical elements, but also of somewhat angular representations of birds, mammals and men, all more or less conventionalized. The color combinations differ also considerably in various regions.

One of the designs found most frequently on textile work is a series of triangles which are similar in their arrangement to the arrow design on Californian basketry. This type of design is found on the belts of the Pueblo Indians of New Mexico and Arizona as well as in Mexico. A comparison with ancient Mexican designs, in so far as they have been preserved on ancient Mexi

can codices, or as they may be recognized on the garments of ancient sculptured figures, shows that these types of weaving did not exist before the advent of the Spaniards and the introduction of European fabrics.

For this reason it is interesting to note that by some tribes the designs are at present given interpretations quite analogous to those found among the Prairie Indians and among other primitive tribes. A collection of belts, ribbons and pouches from the Huichol



tribe of western Mexico (Case 15), illustrates this point. The zigzag triangle, described by the Californian Indians as the arrow design, is called here the "double water-gourd" design. The Indians compare the hourglass figure, which originates from a combination of two triangles, to the double gourd, which has two thick ends and a constriction in the middle. The X-shaped form, also quite common, is interpreted as a brush made of loose fibres tied together in the middle or at one end. A series of scrolls is an element which occurs very frequently in their weav-

ing. It is called the "bridle," because Mexican bridles have on either side of the bit a figure resembling one of these scrolls.

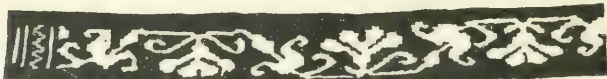
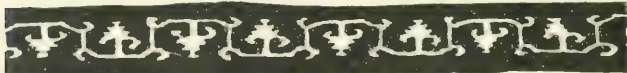


It is also interpreted as the linking of hands. The decorative element

shown in the figure below is interpreted as the steel for striking fire. It is considered as an ornamental elaboration of



the form of steel used in this region. The arbitrary character of the interpretations given by these people may be seen in the elaboration of this design, which is sometimes developed into a continuous band, and is then explained as a vine and flowers. A



very frequent element of decoration is shown below, and is interpreted as roots of plants. The transition from these forms to more realistic ones is very gradual. The simple geometrical forms are combined into plant designs, and, in their most symmetrical arrangement, to flower designs. To these are added sometimes realistic representations of double-headed birds, of mountain-lions and of other animals. Long narrow ribbons covered with designs of this character are generally described as serpents, the design indicating the marks on the serpent's back.



A comparison of the decorative designs exhibited in Case 15 with the designs on ceremonial objects which will be found in Cases 13 and 14, shows a marked difference between the two styles. The execution of the purely ornamental objects is careful,— the



designs are regular in outline, and the conventionalism in interpretation and in form is strong. The decoration on sacrificial objects, on the other hand, is, on the whole, crude; it is throughout pictographic in character. The crudeness of these designs is partly due to lack of skill in the use of the brush and of the carving-tool, and in the application of bead-work by means of wax,— an art which is undoubtedly a survival of the ancient turquoise mosaics. All carved and painted designs of the Huichol Indians seem to be crude, and many of the embroidered designs on sacrificial objects are also poorly executed; but this may be partly due to their temporary character. A few of them, however, are carefully woven; but their designs are pictographic, not geometrical. The interpretation of the conventional decorative designs of the Huichol is, on the whole, in line with the ideas expressed on their ceremonial objects. Their constant thought is the need of rain for their crops; and the water-



gourd, the flowers, the vines and serpents are all considered as symbols of rain or of the vegetation produced by rain.

In this respect the interpretation of the geometrical designs given by the Huichol resembles very much that given by the Pueblo Indians of the arid Southwest. Some of the favorite motives of their decorative art are interpreted in the same manner, terraced triangles with lines descending from them being always interpreted as rain-clouds and falling rain; while zigzag lines represent lightning.

SUMMARY.

The description of these collections shows that in many remote parts of the world primitive people interpret the ornamental designs which they use for decorating objects of everyday use as representations of realistic ideas. Investigations among other peoples, from whom the Museum has no collections, show that the same tendency may be found all over the world. In some cases it has been found possible to bring together a series of decorative motives which show at one end an almost realistic representation of a certain object, while at the other end of the series may be seen a purely conventional form. From this observation the conclusion has been drawn, that, on the whole, geometrical ornaments originated from realistic forms by gradual transformation.

On the other hand, we have seen that in many cases the same form was transferred from one tribe to another by borrowing, as, for instance, among the Indians of the Plains; and that different interpretations were given to the same forms by different tribes. This seems to indicate that the interpretation may also be adapted to the design, or, as we may say, that, according to the favorite concepts of the people, an idea has been "read into" the design.

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CALIFORNIA MOUNTAIN PARTRIDGE
From Grapin Museum

The American Museum Journal

VOL. IV.

OCTOBER, 1904.

No. 4

NEW GROUPS OF GAME BIRDS.



THE acquisition of a complete series of groups of North American game birds showing the nests with their natural surroundings, and eggs or young birds, has been rendered possible through the generosity of friends of the Museum. The Ruffed Grouse, Bob-white and Woodcock being local species, they have been for some time represented in our group collections, but with the funds now available it is proposed to add the game birds of other parts of the country.

Three groups of the proposed series have already been placed upon exhibition, the California Valley and Mountain Partridges, or "Quail," (*Lophortyx californicus* and *Oreortyx pictus plumiferus*), and the Sierra Dusky or Blue Grouse. In each instance a pair of adult birds is shown with their nest, young and a photograph of the nesting site.

The young in the group of Valley Partridge, or "Valley Quail," as it is commonly called in California, are less than a day old, but their well-grown, downy plumage illustrates very well the high degree of development attained by the young of all gallinaceous birds before hatching. The young in the Mountain Partridge, or "Mountain Quail," group are probably a week older, but already have acquired their second plumage and with it the power of flight. The young of the Grouse are in a corresponding stage of plumage.

As to color it will be observed that the plumage of the young of all three species is of dull neutral tints which render the chicks inconspicuous through a more or less close resemblance to the prevailing tone of their surroundings. The female Grouse is also protectively colored and differs strikingly in plumage from her

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mate, who, it is interesting to note in this connection, does not assist in the task of incubation, and, in fact, is far more arboreal in habits than the female.

This Sierra Grouse, it should be remarked, proves to be a heretofore undescribed geographical race or subspecies of the Dusky or Blue Grouse inhabiting the mountainous portions of the western United States. It was previously supposed that Grouse from the Sierras were similar to those of the coast region from Oregon to Alaska, but comparison of specimens shows that the Sierra Grouse differs from both the Coast Range and the Rocky Mountain forms and although the variety more closely resembles the latter than the former, it has evidently been derived from the Coast Range bird of which it is a paler, southern representative. The new Grouse has been named *Dendragapus obscurus sierrensis*.

A fourth California group, though not of a game bird, may be mentioned in the present connection. It shows a family of Yellow-billed Magpies with their bulky, domed nest, a structure so large that two small villages were visited before a box big enough to transport it safely was found. This species has a most restricted range in the foot-hills of the Sierra and Coast Ranges in middle California, and is yearly decreasing in numbers through its habit of eating ground squirrels which have been poisoned by farmers.

Groups of these vanishing species are especially desirable and the Museum is exerting itself to secure, while there is yet time, material which shall show satisfactorily the nesting habits of those of our birds which are rapidly nearing extinction.

F. M. C.

MR. WALTER GRANGER of the Department of Vertebrate Paleontology reports having had good success in finding the small and rare mammals of Eocene age for which he has been searching in southwestern Wyoming. He likewise has obtained the material to complete a skeleton of *Uintatherium*, one of the enormous mammals which characterized the middle Eocene beds of the central west.



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SOCIAL PARASITISM AMONG ANTS.



IN an article published in last year's volume of the Bulletin of the American Museum, the author called attention to the occurrence of certain very diminutive females, or queens, in a species of ant (*Formica microgyna*) from Colorado and Utah.

Unexpected light was thrown on this interesting reduction in the size of the queen by a recent study in the Litchfield Hills (Conn.) of another ant (*F. difficilis*) which is known to have similar queens. Several peculiar mixed colonies were found, each consisting of a fertile queen of *F. difficilis*, either singly or accompanied by a few young workers, living in colonies of another ant (*F. incerta*). Afterward the fact was established, both by observation of the natural colonies and by keeping the ants in artificial nests, that the *difficilis* queen, being too small to bring up her own colony, enters a queenless colony of *F. incerta*, and then turns over her first batch of young to be brought up by the *incerta* workers. As the *difficilis* colony grows to be more and more populous, it gradually emancipates itself from the *incerta* and finally becomes a pure *difficilis* colony, the workers of which are as bold and pugnacious as the queen and her first offspring were timid and conciliatory.

These observations show that *F. difficilis* is a true cuckoo ant, a temporary parasite. All the mixed colonies of ants have hitherto been tacitly regarded as permanent unions or consociations of two species, like the slave-making ants and their slaves, or auxiliaries. The case of *F. difficilis* throws light on a whole series of mixed colonies which have been called abnormal or accidental, merely because they have not often been seen, like the mixed colonies of *Aphaenogaster tennesseense* and *A. fulvum*; *Formica exsectoides* and *F. subsericea*; *F. dakotensis* and *F. subsericea*; and the European as well as the American *F. rufa* and *F. fusca* with their varieties. In all these cases it is highly probable that we are concerned with a normal temporary parasitism of one species of ant on another. The species of *Formica* which exhibit this method of founding their colonies all belong to the

COLLECTING IN FLORIDA AND THE BAHAMAS

rufa and *exsecta* groups, and the forms in whose nests they establish these colonies belong to the more abundant species of the *fusca* and *pallide-fulva* groups. Another ant of a very different sub-family, namely *Aphencogaster tennesseense*, curiously enough, shows a similar reduction in the size of its queens and it too, as certain cases show, in all probability first establishes its colonies in the nests of some one of our numerous varieties of *A. fulvum*. A full account of the temporary parasitism of *F. difficilis* and of several other species will shortly be published.

WILLIAM MORTON WHEELER.

A COLLECTING TRIP TO FLORIDA AND THE BAHAMAS.



THROUGH the generosity of Mr. Nathan A. Bill of Springfield, Massachusetts, the schooner yacht "Gloria" was placed at the disposal of the Museum in May and June for a collecting expedition in the Florida Keys and the Bahama Islands. Professor

William Morton Wheeler of the Department of Invertebrate Zoölogy and Mr. Frank M. Chapman of the Department of Ornithology and Mammalogy embarked on this vessel at Miami, Florida, May 4, 1904, and on May 31 were joined at Nassau, Bahamas, by Dr. B. E. Dahlgren of the Department of Preparation and Installation.

Among birds, material for groups of the Roseate Spoonbill, Snowy Egret, Ani or Black Cuckoo and Flamingo were especially desired. The two former, it was hoped to find in Florida, while the latter were to be looked for in the Bahamas.

The attempt to find the nests of the Spoonbill and Egret resulted in failure. The few Spoonbills known to inhabit an isolated rookery near the southwestern border of the Everglades were reported by the game warden employed by the American Ornithologists' Union and the Florida Audubon Society to have bred at an unusually early date, while the Egrets inhabiting the same rookery had been killed by a band of plume-hunters. It is evident therefore that so long as a single aigrette-bearing heron remains in Florida, it is liable to be pursued for its plumes. As

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a result of this merciless persecution during the season of reproduction, the early extinction in Florida of both these species is assured.

Several days were spent in cruising on the "Gloria" among the Florida Keys, collecting marine and terrestrial invertebrates. The insect fauna peculiar to the mangrove thickets that cover the island was investigated whenever it was convenient to land. The



STAR FISH—A HALF HOUR'S COLLECTING AT ANDROS ISLAND, BAHAMAS

ants, especially, proved to be of great interest, since they have been compelled in these regions to adapt themselves to an arbo-real life; living in the hollow dead twigs of the mangroves and between the bud scales of the singular epiphytic *Tillandsias*.

May 9 the schooner returned to Miami and thence started for the Bahamas. It reached the northern end of Andros Island May 12. From this date till June 30 the work of the expedition was confined to Andros and New Providence Islands and the adjacent keys of the Bahama group.

COLLECTING IN FLORIDA AND THE BAHAMAS

In the Bahamas, Mr. Chapman's search for birds was very successful, and a detailed report of the hunt for nesting Flamingoes, their discovery, and the subsequent study of their before almost unknown home-life will appear later. In due season it is proposed to exhibit a large group of these remarkable birds fully illustrating their nesting habits.

The offer of a small reward in the local Nassau newspaper caused a large part of the idle population of New Providence to



CORALS AND SEA FANS—AN HOUR'S COLLECTING ON ANDROS REEF, BAHAMAS

take to the field in a search for the nest of the Ani (*Crotophaga ani*) or as it is locally called, Blackbird or Carrion Crow. The Ani is in truth a Cuckoo whose nesting habits are, so far as known, unique among birds. From three or four to ten or twelve Anis are usually associated throughout the year. On the approach of the breeding season in June, the birds do not pair, but all unite in building a common nest in which the females of the flock lay their eggs. The number of eggs deposited by a single individual is unknown, but as many as thirty eggs have been found in a single

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nest. Incubation is evidently shared by all members of this communistic family and the care of the young is also a common duty. Nests, eggs, adults and young were secured which will fully illustrate the nesting habits of this interesting bird.

Material was also gathered for a group of white-crowned Pigeons and numerous specimens of Bahama birds were added to the study collection.

Professor Wheeler and Dr. Dahlgren devoted their time to collecting and observing the marine and terrestrial invertebrates. Careful color sketches were made of many of the marine species, with a view to reproducing their living portions in the exhibition collections of the Museum. Some of the larger marine mollusks were modeled from life and drawings made of them. Specimens embodying the results of these studies are in course of preparation and will soon be on exhibition. Materials were also obtained for a group of the land-crabs so characteristic of tropical Florida, the Bahamas and other islands of the West Indies.

The coloration of the corals was found to be rather dull; various shades of yellow predominating, and a bright green or black being seen only occasionally. The coloration of the sponges, on the other hand, is of a most brilliant nature, ranging from bright yellow, orange, red and even vivid purple to a deep black. By the aid of the notes obtained it will be possible to restore accurately the color of a great number of the specimens in the sponge collection, thus giving some idea of their remarkable appearance in a living condition.

Among terrestrial invertebrates Professor Wheeler collected a fine series of mollusks (mainly of the genus *Strophia*) to illustrate geographical distribution and variation, many Myriapoda and Arachnida (chiefly Opilionidae) and practically complete series of the ants (Formicidae) of Andros and New Providence Islands. Only four or five species of Formicidae have been described from the Bahamas. About 50 species, including several new ones of interest in connection with the ant faunas of Cuba and Florida, were taken on the two above-mentioned islands and the adjacent keys. Many of the species have become singularly modified in their habits. Owing to the very small amount of soil on Andros

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and New Providence, nearly all the species have taken to living in the hollow twigs of trees or even in the culms of grasses and sedges. It was only after this fact was discovered that collecting these insects became profitable and interesting.

Dr. Dahlgren's studies were particularly valuable as indicating the desirability and feasibility of reproducing an entire coral reef in the Museum. Such a reef would present a remarkable sight, with its immense masses of corals, with its twenty-five or more species of sea-fans of wonderful beauty, with its flower-like actinians, with its sponges, extraordinary in their brilliancy of coloring, and with its whole world of moving creatures,—enormous holothurians, large mollusks, star-fishes, long-spined sea-urchins and crustaceans and its tropical fishes of every color of the rainbow.

THE LIBRARY.



DURING the past year and a half the Library of the Museum has undergone a complete revision. A large proportion of the volumes and separate articles have been catalogued in both author and subject systems. There are on the shelves upwards of 60,000 volumes, dealing with Natural History subjects in both technical and popular style, the whole constituting the best reference library in this branch of science which is to be found in New York City.

More than 400 periodicals are regularly received, representing all branches of science, but more particularly Natural History. New books and periodicals are being constantly added by gift, exchange and purchase. Among the most noteworthy of recent accessions are complete sets of the "Transactions of the Royal Society of Edinburgh," "Journal of the Bombay Natural History Society," Royal Servian Academy's publications, "Fauna und Flora des Golfes von Neapel," and the "Archiv für Anthropologie."

The Library of the New York Academy of Sciences is also on deposit at the Museum. This contains many rare and valuable

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publications and is especially rich in early numbers of many periodicals now entirely out of print.

The books and periodicals of both libraries are available to the public in the Reading-room, which is open from nine to five daily except Sundays and holidays.

THE CIRCULATING LOAN COLLECTIONS OF NATURAL HISTORY SPECIMENS.



THE work of providing the Public Schools with collections to assist in nature study, which was begun in December, 1903, has been continued through the school year. In this period of six months, more than one hundred collections have been in circulation and have been used in one hundred schools in Greater New York. They have been delivered throughout the boroughs of Manhattan, the Bronx, Brooklyn and Richmond.

For general information a record has been kept which shows the itinerary of each collection and the number of pupils that have studied it in each school. These numbers are furnished by the principals, and the records show that the collections were studied by the following number of pupils:

Birds	Spring, 42,227	
	Fall, 54,367	96,594
Insects.....		34,071
Mollusks.....		10,870
Minerals.....		10,094
Crabs.....		7,428
Starfish		6,523
Sponges.....		2,393
Total.		167,973

Thus in the six months that the collections have been in circulation they have been studied by 167,973 pupils. Their usefulness is attested by the many letters of thanks and appreciation which have been received from teachers and pupils, with

CIRCULATING LOAN COLLECTIONS

the earnest request that the Museum continue the work the coming year.

The way in which the collections have been utilized in the schools is shown by the following extracts from teachers' letters:

"The birds were used for nature lessons and in connection with oral language, writing dictation, color and drawing lessons."

"I should say on the average 1000 children have observed and examined the specimens. Miss O'Brien has been giving a short lecture before the school on the different specimens and started with the crustacea. Her talk is given weekly and the specimens are put right in the children's hands and are passed so each child can see for itself. She talks to eleven assembled classes, making an average of about 500 or 600 children. The teachers then have short compositions written in their class rooms upon Miss O'Brien's talk and in the lower classes an oral review is made. She has lectured on crustacea, starfishes, sea urchins, sponges and corals."

The birds and insects are in greatest demand, as the study of them is required in several grades. There are forty collections of the former, consisting of five birds each and representing twenty species of our more common birds. The following is the itinerary of Collection No. 8, consisting of the Blue Jay, Woodpecker, Crossbill, Junco and English Sparrow.

RECORD OF CIRCULATING COLLECTION NO. 8.

BIRDS.

Date Received.	Length of Time Retained.	No. of Pupils Studying.	School.	Name of Principal or Teacher.
Nov. 30	5 Weeks	2,000	P.S.M.- 25	Matilda Skene.
Jan. 4	4 "	1,450	P.S.M.-105	Carrie W. Kearns.
Feb. 4	3 "	550	P.S.M.- 13	Sarah A. Robinson.
Mar. 2	4 "	1,050	P.S.M.-174	Elizabeth I. Hoper.
Apl. 7	4 "	500	P.S.M.-120	E. Conway.
May 4	4 "	2,018	P.S.M.- 13	Sarah A. Robinson.
June 2	3 "	950	P.S.M.- 12	Teresa C. Burke.
		8,518		

The popularity and usefulness of these circulating collections were further attested by the demand for them in the Vacation

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Schools. Requests for these collections were received from 33 of the Vacation Schools—18 in Manhattan and 15 in Brooklyn—and during the summer 49 of our collections were loaned to them. These were studied by nearly 25,000 children in the four weeks that they were in circulation. The letters from the principals and teachers speak of the great enjoyment and profit the children have obtained from them.

The entire expense of providing the collections and of delivering them at the schools, as well as that of transferring them from one school to another, is borne by the Museum. G. H. S.

THE STUDY COLLECTION OF BIRDS.

WITH the acquisition of the George B. Sennett collection of birds, numbering some 8,000 specimens, the study collection of birds is made to comprise more than 80,000 specimens, with the result that in this country the American Museum collection is second only to that of the United States National Museum. The whole series is being re-arranged and catalogued, so that it may be available for use by students and specialists. It forms the Museum reference library of bird life. It occupies two large rooms on the top floor of the building and is an interesting and tangible evidence of the growth of the Museum in the line of material suitable for research work. Twenty years ago one of the rooms now used for this study collection served as the lecture hall for the beginning of Professor Bickmore's courses of lectures to teachers and not one specimen of the present great collection was in the Museum.

MUSEUM NOTES.



THE new wing for the reception of the power plant of the Museum building has been completed and the machinery has been installed. The dynamos which have been placed in this structure are capable of providing amply for the present needs of the Museum. The wing has been arranged in such a manner as to

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form an attractive exhibit of the production of power from steam and its transformation into electricity. The Members of the Museum and the public in general are cordially invited to examine this portion of the building. The contract for the construction of suitable approaches to the power wing has been let, so that the new wing will soon be easily accessible.

THE Eighth International Geographic Congress, which began its meeting in Washington on September 8, held two days of sessions, September 13 and 14, as the guests of the American Museum. The work of the Congress was divided among twenty-one sections and sub-sections and the several lecture and assembly rooms of the building were utilized in accommodating the Congress. A further account of the meetings of the Congress is necessarily deferred to a later issue of the JOURNAL.

A REPRESENTATIVE collection of ethnological material from the native tribes of Siberia has been presented by President Morris K. Jesup to Nicholas II., Czar of Russia, in recognition of the aid and encouragement shown by His Imperial Majesty in the early years of the Jesup North Pacific Expedition.

THE installation of the extensive collections from Peru illustrating the pre-Columbian and immediately succeeding life of that interesting country has advanced to a point where the hall has been thrown open to the public. The collections are arranged primarily in several series to enable the visitor to make ready comparisons between the different centers of population as to their domestic and tribal relations and occupations. The series comprise particularly rich illustrations of decorative and other art in pottery and weaving.

MR. GEORGE H. PEPPER of the Department of Archaeology has been in Arizona and New Mexico collecting textiles and scientific data concerning them from among the Navajo, the Hopi and other Pueblo tribes. One of the objects of the expedition was the study of an intrusive culture in northeastern New Mexico. The towns here are commonly known as "Mexican" settlements, but

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there is a great infusion of Mexican Indian blood and the textiles are therefore extremely interesting. Up to the present time very little has been known concerning their blankets, and the question of native Indian influence upon their products as well as the counter influence, presents a question well worthy of study. The bearing of this intrusion upon the Southwestern textiles is sure to form an interesting chapter in the history of this primitive industry.

THE memoir on "The Material Life of the Chukchee," by Mr. Waldemar Bogoras, has been completed. It was presented at the International Congress of Americanists held in Stuttgart, in August.

DR. CLARK WISSLER, of the Department of Ethnology, has been pursuing his researches among the Black Foot Indians of Montana and the Canadian side of the border. He reports gratifying success in his investigations of the religious rituals of the Black Foot and has shipped to the Museum extensive collections illustrating their ceremonies. The Royal Ethnographical Museum in Berlin has made an arrangement by which Dr. Wissler has collected material for them as well as for this Museum.

MR. FRANK G. SPECK, of Columbia University, was in the Indian Territory during July and August collecting for the Museum material and linguistic information from the Uchee (a little-known tribe formerly resident in South Carolina), the stock affiliations of which have long been a puzzle to ethnologists. He reports gratifying progress.

DR. BERTHOLD LAUFER, who has been pursuing his researches in China for the past three years in the interests of the East Asiatic Committee, has reached Germany on his return journey and is expected to arrive in New York early in October to take charge of the installation of the collection made by him for the Museum, as well as to begin his lectures at Columbia University.

HONORABLE DEAN C. WORCESTER, Secretary of the Interior, Philippine Insular Government, has presented to the Museum a

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series of nearly 600 photographs representing the different tribes inhabiting the islands of the Philippine group. The photographs are of excellent quality, and their value in the study of the ethnology of the islands is increased by the full notes accompanying them which were made by Mr. Worcester during his extensive travels in the islands.

A COLLECTION of rocks illustrating the geology of Manhattan Island and immediate vicinity has been installed at the north end of the Hall of Geology. The specimens have been arranged to illustrate sections across the island from west to east. Many of the specimens have come from the excavations which have been made for the Subway, while others were obtained before Manhattan Island was as fully covered with buildings as it is at present. The exhibit is accompanied with a geological relief map of the city and vicinity, which has been colored in accordance with the chart issued by the U. S. Geological Survey.

THE collections illustrating the 1902-1903 volcanic eruptions of Mont Pelé, Martinique, and the Soufrière of St. Vincent have been removed to the south end of the Hall of Geology, where the specimens have been arranged in A-cases and may be conveniently studied in connection with the relief map of Martinique which stands near by.

PROFESSOR HENRY FAIRFIELD OSBORN has had the honorary degree of Doctor of Science conferred upon him by the University of Cambridge, England.

THE Museum has completed a series of scrap-books containing prints of all the photographic negatives belonging to it. There are about 13,000 such negatives from all departments of the Museum, representing the work carried on by the institution. The photographs have been arranged according to the geographical distribution of the subjects and they illustrate the geography, geology, mammalogy, ornithology, archaeology and ethnology of many parts of the globe. The photographs are accessible to persons desiring to make studies or to obtain illustrations for educational and scientific purposes.

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THE observation beehive, which was installed in one of the windows of the Hall of Entomology last spring, has proven a constant source of interest to the visitors to the Museum. The bees, some 10,000 in number, that make this hive their home, have been so industrious that the hive has been nearly doubled in size since it was first installed. The hive contains not less than seventy-five pounds of honey and is a practical illustration of what might be accomplished in the way of bee-keeping by any person in the city, at any rate by one living near the parks.

MR. BARNUM BROWN, of the Department of Vertebrate Palæontology, who has been carrying on exploring work in eastern Wyoming during the past season, reports that he has found two Plesiosaur skulls which are in the best and most nearly complete condition of any known to be in existence. With one of the skulls was associated most of the skeleton belonging to the individual. These finds will enable the department to place on exhibition a practically complete skeleton of this rare animal. Mr. Brown furthermore reports the finding of several more or less nearly complete skeletons of Mosasaurs.

MR. J. H. BATTY, who is conducting an expedition in Mexico for the Department of Mammalogy and Ornithology, reports satisfactory progress and has forwarded to the Museum a large quantity of material supplementing the extensive collection already in the building. The boxes comprising Mr. Batty's first shipment of the present expedition contained 274 specimens of mammals, 518 specimens of birds, about 400 specimens of serpents and reptiles and 64 specimens of invertebrates, together with the accessories needed for mounting some of the forms as groups. An important feature of the expedition is the number of negatives which has been taken.

MR. GEORGE H. SHERWOOD of the Department of Invertebrate Zoology spent about a fortnight in August at Southport, Maine, collecting marine invertebrates for the Museum series and for the work being carried on by the Museum in co-operation with the public schools. Among the material resulting from this expedition may be mentioned many beautiful hydroids, a

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great quantity of the finger-sponge, sand-dollars by the hundred, many starfishes of several species, 1,500 sea-urchins (*Strongylocentrotus drobachiensis*) and hundreds of clam-worms (*Nereis*).

PROFESSOR FRANZ BOAS was one of the general introductory speakers in the Department of Anthropology of the International Congress of Arts and Sciences held at the St. Louis Exposition, September 19 to 25 inclusive. Dr. E. O. Hovey was one of the speakers in the section of Geo-Physics in the same Congress.

PROFESSOR MARSHALL H. SAVILLE was one of the International Jury of Award to examine and judge the collections in the group of Archæology at the St. Louis Exposition.

AMONG recent noted visitors at the Museum may be mentioned Prince Hohenlohe-Schillingfürst and Prince von Ratibon and their parties; Prince Pu Lun, Imperial Chinese Commissioner to the St. Louis Exposition and the Chinese Ambassador; Mr. Heromich Shugio, Imperial Japanese Commissioner to the St. Louis Exposition, and Professor Yoshitaro Watanabe of the University of Tokyo; Professor A. C. Haddon of the University of Cambridge; Professors Edouard Seler and Karl von den Steinen of the University of Berlin; Professor L. Manouvrier of the School of Anthropology of Paris; a delegation of forty-two Italian electrical engineers who were sent by the government of Italy for a month's tour of the United States; Dr. Robert Bell, Director of the Canadian Geological Survey; Dr. Hjalmar Stolpe, Director of the Royal Ethnographic Museum at Stockholm; Mr. I. Jurriaan Kok, Director of the Royal Manufactory of Porcelain and Art Pottery at Rozenburg, The Hague, Holland; Dr. G. Bauer of the Royal Ethnological Museum, Berlin; Dr. C. W. Kimmins, Chief Inspector of the Education Department of the London County Council; M. Henri Moissan of Paris, and Dr. A. Smith Woodward of the British Museum (Natural History).

THE HONORABLE NICHOLAS PIKE has deposited in the Museum six volumes containing original water-color representations of more than 400 of the fishes inhabiting the waters of Mauritius. This valuable series of sketches was made by Mr. Pike between

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the years 1870 and 1873, while he was American Consul at Mauritius. Copious notes supplement the information conveyed by the sketches and some are further elucidated by means of careful drawings of the anatomy of the fish.

LECTURES.

In October the regular courses of lectures to the Members of the Museum, to the teachers and to the children of the public schools will be resumed in accordance with programmes to be issued later. The courses of "Free Lectures to the People" which are given in co-operation with the City Board of Education will likewise begin in October and continue to the middle of December as usual.

MEETINGS OF SOCIETIES.

The New York Academy of Sciences will hold its regular meetings at the Museum in accordance with the following programme:

October 3.—Business Meeting and Section of Astronomy, Physics and Chemistry.

October 10.—Section of Biology.

October 17.—Section of Geology and Mineralogy.

October 24.—Section of Anthropology and Psychology.

November 7.—Business Meeting and Section of Astronomy, Physics and Chemistry.

November 14.—Section of Biology.

November 21.—Section of Geology and Mineralogy.

November 28.—Section of Anthropology and Psychology.

December 5.—Business Meeting and Section of Astronomy, Physics and Chemistry.

December 12.—Section of Biology.

December 19.—Annual Meeting.

December 26.—Section of Geology and Mineralogy.

The Linnæan Society and the New York Entomological Society will resume their meetings at the Museum in October. Specific announcements in regard to the meetings of all these societies will be made in the "Weekly Science Bulletin" of the Scientific Alliance of New York.

THE INSECT-GALLS OF THE VICINITY OF NEW YORK CITY.

BY WILLIAM BEUTENMÜLLER

EVERYWHERE throughout the woods, along the roadsides and in the fields, one finds on leaf or twig, stem or root peculiar swellings which evidently are not part of the normal growth of the plant. These deformations when produced by insects are called Galls. Generally one or more eggs are inserted in a bud, a flower, a leaf, a root or some other part of the plant, and the presence of this foreign body, together with the irritation caused by the larva among the vegetable cells, produces an abnormal growth of definite shape and uniform structure. The variety of Galls in respect to structure and substance is great. Every species of Gall-producing insect attacks its own particular plant and a particular part of that plant. Galls are of various sizes and colors and of almost every conceivable shape. Some resemble a tomato or a potato. Some are like the apple, plum, cherry and other small fruits. Some have the appearance of a pine-cone or a seed. They are smooth, wrinkled, downy, hairy or covered with spines and other protuberances. Some are succulent, while others are so fragile that they can be readily crushed, and still others are so corky, hard and woody that it requires a sharp knife to cut them. In color they are of many shades of green, yellow, red, brown and white.

The number of Galls formed by distinct species of insects and mites is so large that only a small proportion of the excrescences or of the insects causing them has yet been described. The present Guide Leaflet gives brief accounts, illustrated by figures drawn to a uniform scale, of some of the more conspicuous Galls made by members of the following families of insects found in the vicinity of New York City:

- (1.) **Hymenoptera** (CYNIPIDÆ and TENTHREDINIDÆ)—Gall-flies and Saw-flies.
- (2.) **Diptera** (CECIDOMYIIDÆ, MYCETOPHILIDÆ and TRYPETIDÆ)—Flies.
- (3.) **Hemiptera** (PSYLLIDÆ and APHIDIDÆ)—Plant-lice and Jumping-lice.
- (4.) **Acarina** (ACARIDÆ)—Mites.

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Besides these groups, which are the principal Gall-producers, some few species of other orders (Coleoptera and Lepidoptera) also produce Gall-like excrescences.

In the following list, the Galls which have been found in the vicinity of New York City are arranged according to the plants upon which they occur. The serial numbers refer to the descriptions on the succeeding pages.

Species No.		Species No.	
Wild Rose (<i>Rosa</i> sp.).		Black Oak (<i>Quercus velutina</i>).	
<i>Rhodites bicolor</i>	1.	<i>Amphibolips confusus</i>	14.
" <i>radicum</i>	2.	<i>Andrius fignr</i>	31.
" <i>globulus</i>	3.	<i>Cecidomyia pilula</i>	66.
" <i>dichlocerus</i>	4.	Scrub Oak (<i>Quercus nana</i>).	
" <i>terna</i>	5.	<i>Amphibolips ilicifoliae</i>	16.
" <i>rosæ</i>	6.	<i>Andricus punctatus</i>	20.
" <i>ignota</i>	7.	" <i>similis</i>	24.
" <i>lenticularis</i>	8.	<i>Cecidomyia pilula</i>	66.
Trailing Blackberry (<i>Rubus canadensis</i>).		Rock Chestnut Oak (<i>Quercus prinus</i>).	
<i>Diastrophus bassettii</i>	9.	<i>Andrius papillatus</i>	23.
Blackberry (<i>Rubus villosus</i>).		" <i>petiolicola</i>	28.
<i>Diastrophus cuneatiformis</i> ..	10.	White Oak (<i>Quercus alba</i>).	
" <i>melanosus</i>	11.	<i>Andrius semimajor</i>	21.
Black Raspberry (<i>Rubus occidentalis</i>).		" <i>pukis</i>	22.
<i>Diastrophus radicum</i>	12.	" <i>lucida</i>	25.
Cinquefoil (<i>Potentilla canadensis</i>).		" <i>petiolicola</i>	28.
<i>Diastrophus potentillæ</i>	13.	" <i>luna</i>	29.
Scarlet Oak (<i>Quercus coccinea</i>).		<i>Cynips pisum</i>	34.
<i>Amphibolips confusus</i>	14.	<i>Acanthis cinnabari</i>	35.
" <i>inimis</i>	15.	<i>Biorhiza portuensis</i>	36.
<i>Andricus punctatus</i>	20.	<i>Holcaspis globulus</i>	37.
<i>Cecidomyia pilula</i>	66.	<i>Neuroterus latatus</i>	41.
Red Oak (<i>Quercus rubra</i>).		<i>Cecidomyia poculum</i>	67.
<i>Amphibolips confusus</i>	14.	Pin or Swamp Oak (<i>Quercus palustris</i>).	
" <i>inimis</i>	15.	<i>Andricus conieus</i>	19.
" <i>callosus</i>	17.	" <i>palustris</i>	26.
" <i>ovatus</i>	18.	<i>Cecidomyia pilula</i>	66.
<i>Andrius incedens</i>	27.	Black Jack Oak (<i>Quercus marylandica</i>).	
<i>Cecidomyia pilula</i>	66.	<i>Andricus punctatus</i>	20.
" <i>incedens</i>	68.	<i>Cecidomyia pilula</i>	66.

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	Species No.		Species No.
Swamp White Oak (<i>Quercus platanioides</i>)		Hickory (<i>Hickoria</i> sp.).	
<i>Andricus petiolicola</i>	28.	<i>Cecidomyia holotricha</i>	56.
<i>capsulus</i>	30.	<i>caracocci</i>	57.
<i>Cynips strobilana</i>	33.	<i>tubicola</i>	58.
<i>Holcaspis duricaria</i>	38.	<i>sanguinolenta</i>	59.
<i>Nematus pallidus</i>	40.	<i>persicoides</i>	60.
<i>noviosus</i>	42.	<i>Phylloxera caryocaulis</i>	86.
<i>flavosus</i>	43.		
<i>umbilicatus</i>	44.	Dogwood (<i>Cornus florida</i>).	
		<i>Cecidomyia clavula</i>	64.
Post Oak (<i>Quercus minor</i>)		Touch-me-not (<i>Impatiens bi-flora</i>).	
<i>Andricus petiolicola</i>	28.	<i>Cecidomyia impatiens</i>	65.
<i>Dryophanta polita</i>	39.		
Scrub Chestnut Oak (<i>Quercus prinoides</i>).		Goldenrod (<i>Solidago</i> sp.).	
<i>Cynips prinoides</i>	32.	<i>Cecidomyia solidaginis</i>	69.
		<i>Trypeta polita</i>	74.
Wild Lettuce (<i>Lactuca canadensis</i>).		<i>solidaginis</i>	75.
<i>Aulax tumidus</i>	46.		
Willow (<i>Salix</i> sp.).		Grape (<i>Vitis</i> sp.).	
<i>Nematus pomum</i>	47.	<i>Cecidomyia viticola</i>	70.
<i>Euura ovum</i>	48.	<i>cutis-pomum</i>	71.
<i>Cecidomyia strobiloides</i>	61.	<i>Lasioptera vitis</i>	72.
<i>rigidæ</i>	62.		
<i>batatas</i>	63.	Red Maple (<i>Acer rubrum</i>).	
		<i>Sciara ocellata</i>	73.
Alder (<i>Alnus rugosa</i>).			
<i>Cecidomyia serrulata</i>	49.	Hackberry (<i>Celtis occidentalis</i>).	
		<i>Pachypsylla venusta</i>	76.
Basswood (<i>Tilia americana</i>).		<i>celtidis-gemma</i>	77.
<i>Cecidomyia verrucicola</i>	50.	" <i>-vesiculum</i>	78.
		" <i>-mamma</i>	79.
Tulip-tree (<i>Liriodendron tulipifera</i>).		" <i>-cucurbitæ</i>	80.
<i>Cecidomyia tulipifera</i>	51.		
<i>liriodendri</i>	52.	Witch Hazel (<i>Hamamelis virginiana</i>).	
		<i>Hormaphis hamamelidis</i>	81.
Wild Cherry (<i>Prunus serotina</i>).		" <i>spinosus</i>	82.
<i>Cecidomyia serotinæ</i>	53.		
<i>Alnus serotinæ</i>	87.	Elm (<i>Ulmus americana</i>).	
		<i>Colopha ulmicola</i>	83.
White Ash (<i>Fraxinus americana</i>).			
<i>Cecidomyia pellex</i>	54.	Sumac (<i>Rhus glabra</i>).	
		<i>Pemphigus rhois</i>	84.
Honey Locust (<i>Gleditsia triacanthos</i>).			
<i>Cecidomyia gleditschiæ</i>	55.	Huckleberry (<i>Vaccinium</i> sp.).	
		<i>Solenozopheria vaccini</i>	45.
		Poplar (<i>Populus</i> sp.).	
		<i>Pemphigus populiculis</i>	85.

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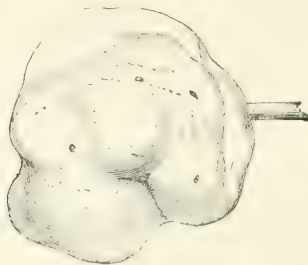
HYMENOPTERA. (Bees, Wasps etc.)

FAMILY CYNIPIDÆ (Gall-flies).

The species belonging to this family are small wasp-like insects termed Gall-flies because the majority of the species live within Galls. In the adult Gall-fly, the abdomen is usually much compressed and is joined to the thorax by a short peduncle. The wings have comparatively few veins, while some species are wingless. The antennæ are not elbowed. They consist of from 13 to 16 joints. The larvæ are maggot-like.

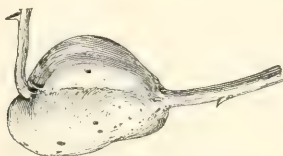


1. **Spiny Rose Gall** (*Rhodites bicolor* Harr.).—Spherical, covered with many long prickly spines. Yellowish green sometimes tinged with red in summer, and brown in winter. Soft in summer, woody in winter. Diameter $\frac{1}{8}$ to $\frac{1}{2}$ in. On twigs of wild roses. Rather common.

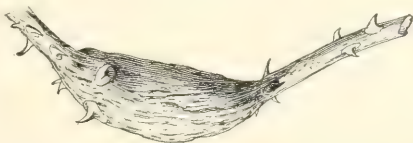


2. **Rose Root Gall** (*Rosaceo-rythmum* OstenSacken).—Irregularly rounded with a deep impression above and below at place of attachment. Smooth reddish brown. Pithy in substance, containing numerous cells. Length $1\frac{1}{2}$ to 2 in. At roots of the wild rose. Not common.

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3. **Globular Rose Gall** (*Rhodites globulus* Beuten.).—Smooth, rounded or oblong, rising at each end abruptly from the branch. Rather soft and corky, containing numerous cells. About $\frac{3}{4}$ to 1 in. long and $\frac{3}{4}$ in. in diameter. On swamp rose (*Rosa carolina*). Not common.



4. **Long Rose Gall** (*Rhodites dichlocerus* Harr.).—Elongated, hard and woody, gradually tapering at both ends. Color reddish. Length from $1\frac{1}{2}$ to almost 2 in. Width about $\frac{1}{2}$ in. On stems of wild roses. Not common.



5. **Knotty Rose Gall** (*Rhodites verna* Osten Sacken).—Oblong or rounded and $\frac{1}{2}$ in. long. Sometimes there is a series of three or more swellings attached to each other. Reddish, hard and woody, with many cells inside. On stems of wild roses. Not common.



6. **Mossy Rose Gall** (*Rhodites rosa* Linn.).—Composed of an agglomera-

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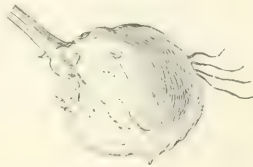
tion of hard cells around a branch and is densely covered with long green filaments forming a moss-like mass. About $1\frac{1}{2}$ in. in diameter. On the twigs of sweet brier (*Rosa rubiginosa*). Common locally.



7. **Mealy Rose Gall** (*Rhodites ignota* Osten Sacken).—Round, woody, about the size of a large pea, and covered with a white mealy substance. Sometimes two or three coalesce, thus forming an elongated mass of more irregular shape. Inside are several cells. On leaves of wild roses. Common.



8. **Rose Lentil Gall** (*Rhodites lenticularis* Bass.)—Lentil shaped. In the petiole and vein of the leaves of the wild rose (*Rosa lucida*). $\frac{1}{16}$ to $\frac{1}{8}$ in. in horizontal, and $\frac{1}{16}$ in. in vertical diameter. Not common.



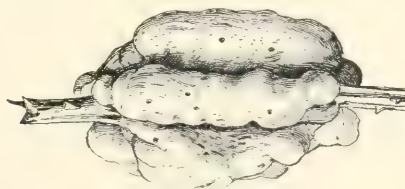
9. **Bassett's Blackberry Gall** (*Diastrophus bassettii* Beuten.).—Irregularly

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rounded or somewhat elongated. From about $\frac{1}{2}$ to 1 in. in diameter. Composed of a pithy substance with many rounded cells inside. Greenish, tinged with red. On the stems of the trailing blackberry (*Rubus madriensis*), close to the ground. Not common.



10. **Blackberry Seed Gall** (*Diastrophus cuscuteiformis* Osten Sacken).—Consists of small globular, woody, seed-like bodies, pressed closely together, each provided more or less with spines. On stems of blackberry. Not common.



11. **Blackberry Knot Gall** (*Diastrophus nebulosus* Osten Sacken).—Oblong, surface somewhat uneven, with deep longitudinal furrows which divide the gall more or less completely into four or five parts. Length from 1 to 3 in. and diameter about 1 to $1\frac{1}{2}$ in. Dark green, turning reddish as the season advances. Hard, corky, with many oblong cells inside. On stalks of blackberry (*Rubus villosus*). Very common.



12. **Raspberry Root Gall** (*Umbelopsis radicum* Bass).—Irregularly rounded. Varying greatly in size and in shape from that of a pea to lobes

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nearly 2 in. in length and 1 in. in diameter. On roots of black raspberry (*Rubus occidentalis*). Common.



13. **Cinquefoil Axil Gall** (*Diastrophus potentillæ* Bass.).—Spherical or oblong, about $\frac{1}{3}$ to $\frac{1}{2}$ in. in diameter, containing a single cell. Green in summer; brown and spongy in winter. On axils of leaves of cinquefoil (*Potentilla canadensis*). Common.

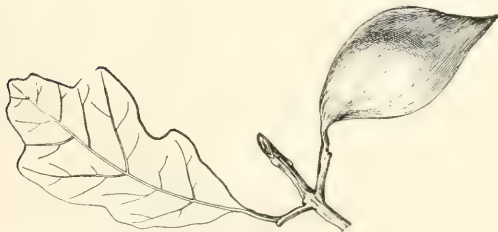


14. **Oak or May Apple** (*Amphibolips confluentus* Harr.).—Large, globular, more or less smooth outside and filled with a spongy substance, in the center of which is a hard woody kernel containing the larval cell. From 1 to 2 in. in diameter. When fresh, it is pale green, soft and succulent, with the contents whitish. Later in the season the shell becomes brown, hard and brittle, with the kernel woody and the spongy substance dark brown, but remaining soft. Confined to the leaves of the trees belonging to the red oak group. Common.

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15. **Empty Oak Apple** (*Amphibolips inanis* Osten Sacken).—Shape like the preceding, but considerably smaller. Almost empty, the larval cell being kept in position by radiating filaments. Green and soft when young; brown and brittle when dry. On leaves of scarlet (*Quercus coccinea*) and red oak (*Q. rubra*).

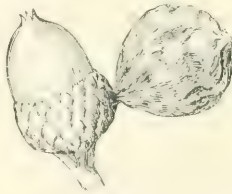


16. **Scrub Oak Gall** (*Amphibolips ilicifoliae* Bass.).—Elongated, fusiform, tapering at both ends, with the apex long and more slender than the base. Length about $1\frac{1}{2}$ in.; width about $\frac{3}{4}$ inch. Within is an elongated kernel held in position by radiating fibers. Green and soft in summer; brown and brittle in winter. On the leaves and petioles of dwarf oak (*Quercus nana*). Not common.

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17. **Oak Spindle Gall** (*Amphibolips cælebs* Osten Sacken).—Elongated, spindle-shape, soft and green. Contains a kernel held in position by radiating fibers. Length $1\frac{1}{2}$ in. On leaf of red oak (*Quercus rubra*). Not common.



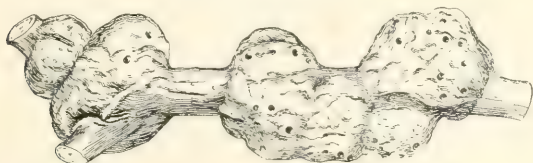
18. **Acorn Plum Gall** (*Amphibolips prunus* Walsh).—Globular, somewhat wrinkled or smooth, fleshy but solid; resembles a plum or cherry. About $\frac{1}{2}$ to 1 mm in diameter. Bright crimson outside, pinkish inside and shading to yellow towards the center. In the center is a single cell in which the larva lives. On cupules of red oak (*Quercus rubra*). August and September. Sometimes rather common.



19. **Horned Knot Oak Gall** (*Adelges quercus* Osten Sacken).—Irregularly globular, with numerous black protuberances, through which the gall thence escape. Very hard and woody. Color of the branch. Inside brown with many larval

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cells. About $\frac{1}{2}$ to $1\frac{1}{2}$ in. in diameter. On branches of the pin oak (*Quercus palustris*). Exceedingly common throughout the year.



20. **Oak Knot Gall** (*Andricus punctatus* Bass.).—Shape similar to the preceding gall, but without the horn-like protuberances. Sometimes found singly, but often a number may be seen, in greater or less proximity on the same branch. On black jack oak (*Quercus marylandica*) scarlet oak (*Q. us cocinea*) and rarely on scrub oak (*Q. us nana*). Common.



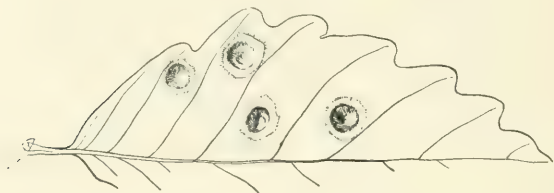
21. **Oak Seed Gall** (*Andricus seminator* Harr.).—Composed of a woolly substance and irregularly rounded. Inside are numerous bodies adhering to the twig and resembling canary seeds. About 1 to $1\frac{1}{2}$ in. in diameter. Pure white sometimes tinged with red; toward the middle of the summer it assumes a rusty brown color and gradually drops off the twig. On twigs of white oak (*Quercus alba*). Common.



22. **Oak Wart Gall** (*Andricus junis* Osten Sacken).—Rounded, somewhat

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flattened, projecting on both sides of the leaf. Inside are two or three seed-like, oblong kernels, kept in position by white filaments. Pale green. In numbers on leaves of white oak (*Quercus alba*). Very common.



23. **Oak Nipple Gall** (*Andricus papillatus* Osten Sacken).—Rounded and somewhat nipple-shaped. Projects on both sides of the leaf and is enclosed in a reddish areola on the under side of the leaf. This is a very characteristic feature and distinguishes it from the preceding species. Inside are two or three kernels each containing a single larva. In numbers on leaves of chestnut oak (*Quercus prinus*). Common.



24. **Scrub Oak Club Gall** (*Andricus similis* Bass.).—Club-shaped, blunt at apex, club end generally turned to one side. Length $\frac{1}{2}$ to 1 in. Hard and woody, with a few leaves growing from it in summer. On terminal twigs of scrub oak (*Quercus coccinea*). Not common.

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25. **White Oak Club Gall** (*Andricus clavula* Bass.).—Club-shaped, hard and woody, with a few leaves growing from it. Length $\frac{1}{2}$ to 1 in. Green in summer; brown in winter. On tips of twigs of white oak (*Quercus alba*). Very common.



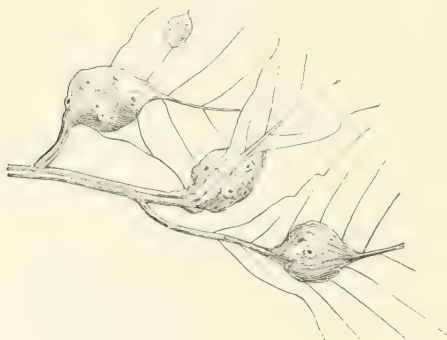
26. **Succulent Oak Gall** (*Andricus palustris* Osten Sacken).—Globular, green, succulent. Hollow inside, with a small seed-like kernel which rolls about freely. Diameter about $\frac{1}{2}$ in. On buds and young leaves of pin oak (*Quercus palustris*). May.



27. **Small Oak Apple** (*Andricus singularis* Bass.).—Globular, smooth,

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with an oblong kernel inside held in position by radiating fibers. Green and soft in spring; brown and brittle later in the season. Varies from $\frac{1}{4}$ to $\frac{1}{2}$ in. in diameter. On leaves of red oak (*Quercus rubra*). Rather common.

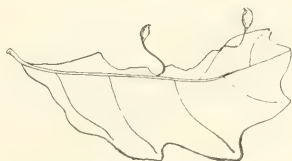


28. **Oak Petiole Gall** (*Andricus petiolicola* Bass.).—Rounded or club-shaped, hard and woody, with many cells inside. About $\frac{1}{4}$ in. in diameter. Green in summer, brown in winter. On petiole base or midrib of leaf of white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), swamp white oak (*Quercus platypholia*), and post oak (*Quercus marilandica*). Common.



29. **Oak Wool Gall** (*Andricus lanus* Fitch.).—Very much resembles a mass of wool, downy in texture. When ripe, bright chestnut colored, made with many small, seed-like capsules, crowded together and attached by short, downy hairs. On the under side of ribs of leaf of white oak (*Quercus alba*), chestnut oak (*Quercus prinus*), and post oak (*Quercus marilandica*). Common.

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30. **Oak Capsule Gall** (*Andricus capsulus* Bass.).—Oval and attached to a pedicel, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Resembles the capsule of certain mosses. On the margin of leaf of swamp white oak (*Quercus platanooides*). Not common.



31. **Oak Midrib Gall** (*Andricus piger* Bass.).—A large, irregular woody swelling on the midrib of leaf of black oak (*Quercus velutina*), always on the under side and usually on the lower half of the leaf. Upper side indicated by a widening of the midrib and a slight depression of the leaf at that point. Rather common.



32. **Spiny Oak Gall** (*Cynips prinoides* Beuten.).—Globular, covered with numerous cone-like projections, hard and woody, with a small cell inside. About $\frac{1}{2}$ in. in diameter. Green, tinged with red. On upper side of leaf of dwarf chestnut oak (*Quercus prinoides*). Not common.

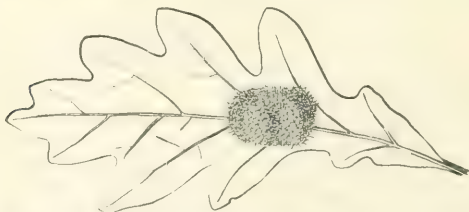
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33. **Pine-Cone Oak Gall** (*Cynips strobilana* Osten Sacken).—Consists of many wedge-shaped bodies, closely packed together, with their pointed bases attached to a common center. Hard and corky with a single cell in each. They break off readily when dry. On twigs of swamp white oak (*Quercus phumoides*). Not common.



34. **Oak Pea Gall** (*Cynips pisum* Fitch).—Globular, green and about the size of a pea, which it resembles in general appearance. Surface finely netted with fissures or cracks and intervening elevated points. Inside are two cavities divided in the middle by a thin partition. On upper and under sides of leaves of white oak (*Quercus alba*).



35. **Oak Hedgehog Gall** (*Acraspis erinacea* Walsb).—Rounded or oblong

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oval, covered with numerous, rather long spines. Length about $\frac{3}{4}$ in. Yellow or greenish yellow with the spines bright red, especially when young. On one of the principal veins of leaf of white oak (*Quercus alba*). Common.



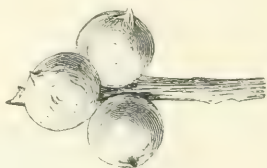
36. **Oak Fig Gall** (*Biorhiza forticornis* Walsh).—Consists of many small, soft, bladder-like bodies, each containing a single cell, which is held in position by radiating fibers. They are closely pressed together and somewhat resemble figs packed in boxes,—hence the name “Fig Gall.” Pale yellow, often beautifully tinged with bright red. Brown in winter. On twigs of white oak (*Quercus alba*). Common.



37. **Oak Bullet Gall** (*Holcaspis globulus* Fitch).—Bullet-like, corky, with a small cavity in the center containing a single larva living in an oval, whitish

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shell. Yellow, tinged with red in summer, brown in winter. Grows singly or in clusters of two or three on terminal twigs of white oak (*Quercus alba*). Common.



38. **Pointed Bullet Gall** (*Holcaspis duricaria* Bass.).—Globular, with a horn point at the apex. Hard and woolly, with a small cavity in the center containing a small oval, whitish shell in which the larva lives. Yellow and tinged with red in summer; brown in winter. On terminal twigs of swamp white oak (*Q. bicolor*, *platensis*) growing singly or in clusters of two or more. Common.



39. **Polished Oak Gall** (*Dryophanta polita* Bass.)—Globular, smooth, with a thin outer shell. Inside is a single round cell held in position by radiating fibers. Pale green, sometimes tinged with red, and about $\frac{1}{16}$ to $\frac{1}{8}$ in. in diameter. Occurs singly or in clusters of two or three at or near the summit of young and thrifty shoots of post oak (*Q. lyrata*). Grows singly or in clusters. August and September. Not rare in the pine barrens of New Jersey.

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40. **Oak Flower-Stem Gall** (*Neuroterus pallidus* Bass.).—Small, unevenly globular, smooth and of a fine, soft cellular consistence. Pale wood color. In masses on flower stems of swamp white oak (*Quercus platanooides*). Not common.



41. **Oak Potato Gall** (*Neuroterus batatus* Fitch).—Generally large and uneven, often resembling a potato in shape. Hard and woody, the surface being coated with a pale bluish bloom. Inside it is dense, corky, with many larval cells. On white oak (*Quercus alba*) below the terminal shoot. Common.

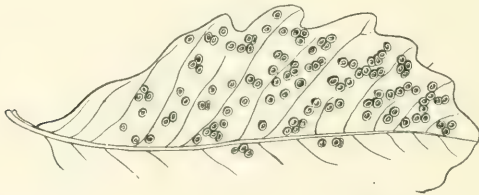


42. **Noxious Oak Gall** (*Neuroterus noxiosus* Bass.).—Irregularly rounded, hard and woody, with many larval cells inside. On the terminal twigs of swamp white oak (*Quercus platanooides*). Common.

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43. **Oak Flake Gall** (*Neuroterus floccosus* Bass.).—Small, hemispherical, covered with white hairs. Found in numbers on the under side of leaf of swamp white oak (*Quercus platanoïdes*). On the upper side of the leaf it is indicated by a small, smooth, shining blister-like elevation. Common.

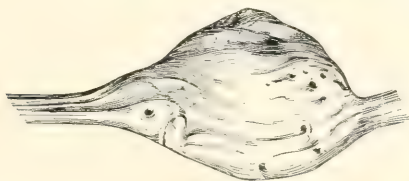


44. **Oak Button Gall** (*Neuroterus umbilicatus* Bass.).—Small, rounded, much depressed, with a rather deep cavity on top, in the center of which is a minute nipple. About $\frac{1}{16}$ in. in diameter. Found in numbers on the under side of leaf of swamp white oak (*Quercus platanoïdes*). On the upper side of the leaf it is indicated by a circular spot. Common.



45. **Huckleberry Gall** (*Solenopheria vacinii* Ashm.).—Rounded, elongate, conceals at place of attachment to the stem, turning the same downward. Green and pithy in summer, brown, hard and woody in winter. On stems of huckleberry. Common.

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46. **Lettuce Tumor Gall** (*Aulax tumidus* Bass.).—Varies greatly in shape and size from a slight, knotty and irregular enlargement of the stalk to a large and more or less ovate swelling, 2 to 3 in. long and 1 in. in diameter. Inside it is pithy and filled with many cells. Found on the main stalk of wild lettuce (*Lactuca canadensis*), usually near the summit, often in the pample itself, and then covered with the short flower stems. Common.

FAMILY TENTHREDINIDÆ (Saw-flies).

With few exceptions the members of this family do not produce galls, the larvæ being leaf-eaters. The larvæ very much resemble the caterpillars of butterflies and moths, but they have, ordinarily, from 12-16 prolegs, while true caterpillars have as a rule only 10. The adult female is furnished with a pair of saws at the end of the abdomen which she uses to make slits in the leaves and stems of plants in which she places her eggs.



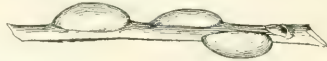
47. **Willow Apple Gall** (*Nematus pomum* Walsh).—Rounded and fleshy, somewhat resembling a miniature apple. Yellowish green, usually with a rosy cheek. Measures about $\frac{1}{2}$ in. in diameter. On leaves of bush willow. July and August. Rather common.

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DIPTERA (Flies).

FAMILY CECIDOMYIIDÆ (Gall-gnats).

The members of this family are minute flies with the wings and body clothed with long hairs. The larvæ are small brightly-colored maggots, being red, pink, yellow or orange.



48. **Willow Egg Gall** (*Euura ovum* Walsh).—Oval or elongated. Placed lengthwise on one side of a twig, often in a row of two or more. Hard and woody. On the stems of bush willow growing in swampy places. Rather common.



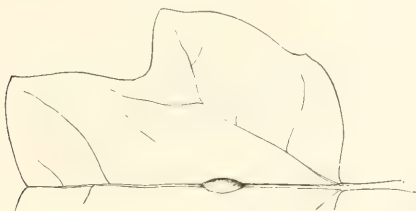
49. **Alder Bud Gall** (*Cecidomyia serrulata* Osten Sacken).—Rounded, bud-like, with the apex pointed, and often covered with a whitish bloom. Greenish in autumn and brown in winter. This gall is a deformation of the terminal bud of the common alder (*Alnus rugosa*). Rather common locally.



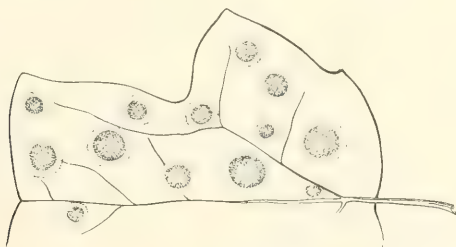
50. **Basswood Wart Gall** (*Cecidomyia cornuta* Osten Sacken).—Rounded,

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wart-shaped, about $\frac{1}{8}$ in in diameter. In numbers on the same leaf of bass-wood (*Tilia americana*) July and August. Rather common.



51. **Tulip-tree Midrib Gall** (*Cecidomyia tulipifera* Osten Sacken).—A small rounded swelling on the midrib of the leaf of the tulip tree (*Liriodendron tulipifera*). Not common.



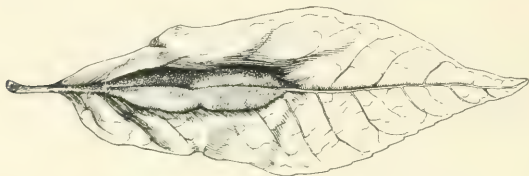
52. **Tulip-tree Spot Gall** (*Cecidomyia liriodendri* Osten Sacken).—Forms brown spots with a yellow or greenish areola on the leaves of the tulip tree (*Liriodendron tulipifera*). Common.



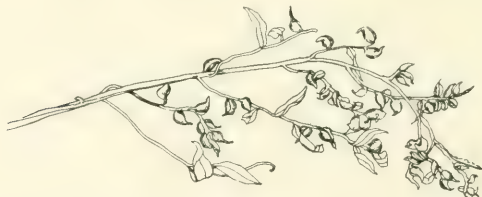
53. **Wild Cherry Bud Gall** (*Cecidomyia serotinae* Osten Sacken).—Rounded, club-shaped, with one or two leaves growing from its sides. Bright red in

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spring; brown in winter. This gall is an enlargement of the terminal bud of young shoots of the wild cherry (*Prunus serotina*). Common.



54. **Ash Midrib Gall** (*Cecidomyia pellex* Osten Sacken).—Rounded, oblong or very much elongated, succulent. Under side indicated by being somewhat swollen. Pale green, sometimes tinged with red. Length from 1 to 2 in. On midrib of leaf of ash (*Fraxinus americana*). May and June. Rather common.



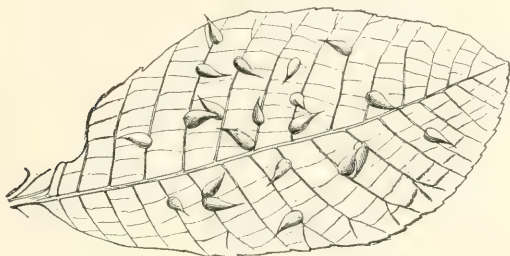
55. **Honey-locust Pod Gall** (*Cecidomyia gleditschiae* Osten Sacken).—Formed of a single leaflet in such a way as to assume the shape of a small pod. On the leaves of honey-locust (*Gleditsia triacanthos*). Sometimes nearly all the leaves on the terminal twigs are deformed in this way. Not common.



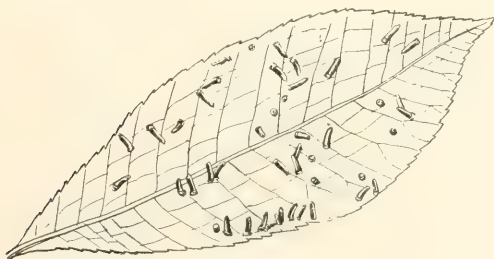
56. **Hickory Onion Gall** (*Cecidomyia helotricha* Osten Sacken).—Sub-

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globular, onion-shaped and covered with pubescence which is pale when the gall is young and growing, and becomes rust-colored when mature. Inside it is hollow and contains a single larva. On the under surface of the leaves of different kinds of hickory. Sometimes they cover the entire under surface of the leaf. Very abundant.

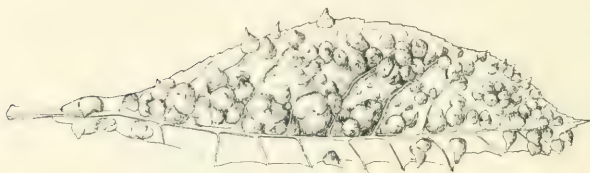


57. **Hickory Seed Gall** (*Cecidomyia caryæcola* Osten Sacken).—Smooth, elongated, rounded, with the tip produced into a point. Pale green. In clusters on the under surface of leaves of different kinds of hickory. Common.

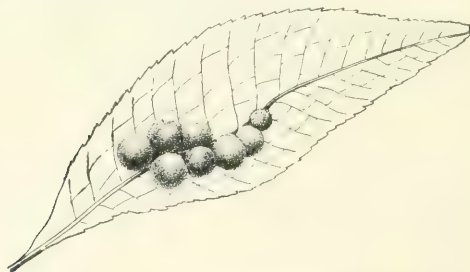


58. **Hickory Tube Gall** (*Cecidomyia tubicola* Osten Sacken).—Narrow, cylindrical, tube-like, inserted in a small protuberance on the leaf, breaking off very easily. Green when immature; black when fully grown. On under surface of the leaves of different kinds of hickory. Common.

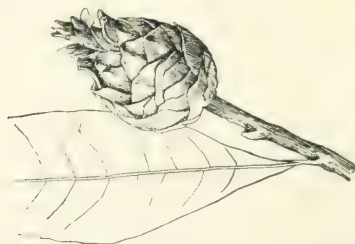
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59. **Hickory Cone Gall** (*Cecidomyia sanguinolenta* Osten Sacken).—Conical, somewhat narrowed at the base and of a blood red or purplish red color. In numbers on the under surface of the leaves of hickory. Not common.



60. **Hickory Peach Gall** (*Cecidomyia persicoides* Osten Sacken).—Variable in shape, usually rounded and clothed with delicate down like that of a peach, looking somewhat like a diminutive fruit of this kind. On the under surface of the leaves of hickory. Common.



61. **Pine-Cone Willow Gall** (*Cecidomyia strobiloides* Osten Sacken).—Formed of closely imbricated leaves assuming the shape of a cone. On the terminal twigs of different kinds of low willow. Common.

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62. **Willow Club Gall** (*Cecidomyia rigidæ* Osten Sacken).—Elongated, club-like, tapering to a point at the apex, and with a number of small terminal buds growing from it. Length about $\frac{3}{4}$ in. On tips of branches of low willow. Rather common.

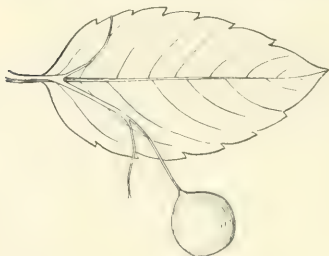


63. **Willow Potato Gall** (*Cecidomyia batatas* Osten Sacken).—Irregularly rounded, varying considerably in size and in shape. Hard and woody. Sometimes the different forms are strung together, one after another, in more or less proximity, on the same twig. On branches of willow (*Salix discolor*). Common.



64. **Dogwood Club Gall** (*Cecidomyia clavula* Beuten.).—Club-shaped and about $\frac{1}{2}$ to 1 in. long. Inside is an elongated channel inhabited by a single larva. Green in summer and the color of the bark in winter. On terminal twigs of dogwood (*Cornus florida*). Common.

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65. **Touch-me-not Gall** (*Cecidomyia impatiens* Osten Sacken).—Globular, succulent, semi-transparent, containing a number of cells inside. At base of flower of touch-me-not (*Impatiens biflora*). August. Not common.



66. **Oak Pill Gall** (*Cecidomyia pilula* Walsh).—Usually rounded, hard and woody. Frequently two or more galls are confluent and assume a very irregularly rounded or elongated form. Inside are several cells. Brown or green. On upper surface of leaves of different kinds of oak. Very common.



67. **Oak Spangles** (*Cecidomyia poculum* Osten Sacken).—Rounded, saucer-

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shaped. Pale red to light lavender. In clusters on under surface of leaf of white oak (*Quercus alba*). August and September. Common.



68. **Oak Fold Gall** (*Cecidomyia niveipila* Osten Sacken).—Consists of a large fold lined with white pubescence. Sometimes the entire leaf is folded with the edges curled, the under side of the leaf being inside of the gall. On red oak (*Quercus rubra*). May and June. Common.

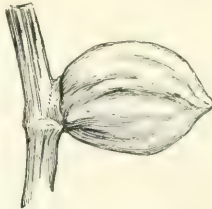


69. **Goldenrod Bunch Gall** (*Cecidomyia solidaginis* Loew).—Produced by the arrest of the stalk, which causes the leaves to accumulate, thus forming a globular bunch, consisting of several hundred leaves. On goldenrod (*Solidago*) Very common.

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70. **Grape-vine Tube Gall** (*Cecidomyia viticola* Osten Sacken).—Narrow, elongated or conical. Green or bright red. In numbers on upper side of the leaves of wild grapes. July and August. Not common.



71. **Grape-vine Apple Gall** (*Cecidomyia vitis-pomum* Walsh and Riley).—Variable in size and in shape, usually rounded, flattened at the base and pointed at the top. When mature the gall often has eight or nine longitudinal ribs, like a muskmelon. Inside are numerous longitudinal cells each divided by a transverse partition. On stems of wild grapes. Common.



72. **Grape-vine Tomato Gall** (*Lasioptera vitis* Osten Sacken).—Consists of a bunch of irregular swellings of various rounded shapes. Soft, juicy and suc-

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culent. Yellowish green, tinged with red or entirely of this color. On stems and leaf stalks of wild grapes. May and June. Common.

FAMILY MYCETOPHILIDÆ (Fungus-gnats).

The species of flies belonging to this family are of medium or small size and are more or less mosquito-like in form. Most of them feed on fungi and in damp places where there is decaying vegetable matter.



73. **Maple Spot Gall** (*Sciara ocellata* Osten Sacken).—Eye-like, circular, flat. Light yellow, with a red central dot, or entirely green or yellow. In numbers on the leaves of red maple (*Acer rubrum*). Common.

FAMILY TRYPETIDÆ.

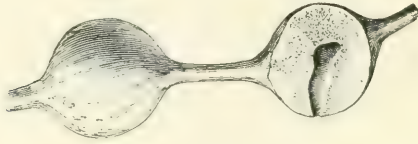
Only a certain number of species belonging to this family of flies produce galls. The wings of many of the species are beautifully marked with spots or bands.



74. **Goldenrod Gall** (*Trypeta folita* Loew).—Consists of a small bunch of

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accumulated aborted leaves, $\frac{1}{2}$ to $\frac{3}{4}$ in. long. Caused by the arrest of the side branches. Inside, at the base, is a hollow space in which the larva lives. On stalk of goldenrod (*Solidago altissima*). Singly or in numbers. Common.



75. **Goldenrod Ball Gall** (*Trypeta solidaginis* Fitch).—Globular, ball-like and about 1 in. in diameter. Pithy inside with a rounded cell in the center. On the main stalk of goldenrod. Common.

HEMIPTERA (Bugs).

FAMILY PSYLLIDÆ (Jumping Plant-lice).

The insects belonging to this family subsist entirely upon the juices of plants. They are comparatively small, measuring from $\frac{1}{8}$ to $\frac{1}{16}$ inch in length. Their hind legs are formed for jumping.

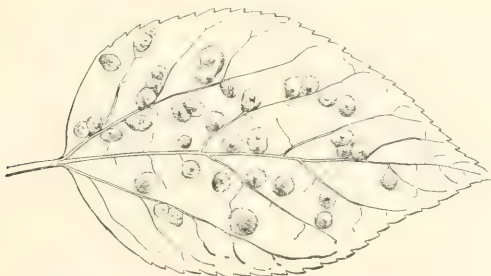


76. **Hackberry Petiole Gall** (*Pachypsylla venusta* Osten Sacken).—Globular or irregularly rounded. Consists of a thin outer shell with several compartments inside. On petiole of the leaf of hackberry (*Celtis occidentalis*). Not common.

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77. **Hackberry Nodule Gall** (*Pachypsylla celtidis-gemma* Riley).—Variable in size and in shape. Bud-like and looking as if formed by the agglomeration of a number of rounded nodules. Hard and woody, with a number of cells inside. On branches of hackberry (*Celtis occidentalis*). It is a deformation of the young bud. Common.



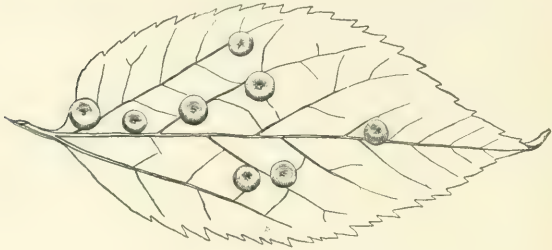
78. **Hackberry Blister Gall** (*Pachypsylla celtidis-vesiculum* Riley).—Circular, flat and blister-like. Convex on the under side with a small nipple in the middle. Green. In numbers on leaf of hackberry (*Celtis occidentalis*). Common.



79. **Hackberry Nipple Gall** (*Pachypsylla celtidis-mamma* Riley).—Repre-

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sented by a cup-shaped impression on the upper side of leaf and on the under side it is sub-cylindrical, with the apex rounded bluntly. About $\frac{1}{4}$ in. high and $\frac{1}{2}$ in. wide. On leaf of hackberry (*Celtis occidentalis*). Common.



80. **Hackberry Melon Gall** (*Pachypsylla celtidis-cucurbitæ* Riley).—Under side rounded, truncated at apex and concave in the middle, with a small nipple. Around the top is usually an acute ridge which surrounds the concave depression, and at the sides near the top are short ribs which are sometimes nearly obliterated. Represented by a cup-shaped impression on upper side of leaf. On under side of leaf of hackberry (*Celtis occidentalis*). Common.

FAMILY APHIDIDÆ (Plant-lice).

The plant-lice are well-known insects and infest nearly all kinds of plants. Comparatively few produce galls.

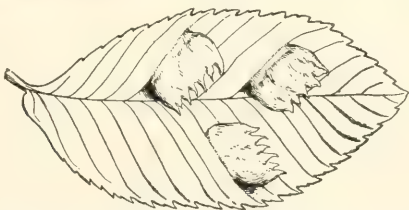


81. **Witch Hazel Cone Gall** (*Hormaphis hamamelidis* Fitch).—A conical gall on upper side of leaf of witch hazel (*Hamamelis virginiana*). Very common.

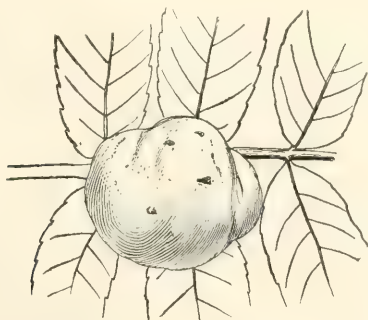
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82. **Spiny Witch Hazel Gall** (*Hormaphis spinosus* Shiner).—A deformation of the fruit bud, covered with a number of rather long spines, with a funnel-like exit at the base. Green in summer; brown in winter. On witch hazel (*Hamamelis virginiana*). Common.



83. **Cock's Comb Elm Gall** (*Colopha ulmicola* Fitch).—Forms a cock's comb, blubbery-like growth on the upper side of the leaf of the elm (*Ulmus americana*). June. Common.



84. **Sumac Tomato Gall** (*Pemphigus rhois* Fitch).—Smooth, rounded.

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somewhat resembling a tomato in shape. Inside it is hollow and filled with lice. Yellowish green, tinged with red. On under side of leaf of smooth sumac (*Rhus glabra*) and stag-horn sumac (*Rhus typhina*). Common.



85. **Poplar Stem Gall** (*Pemphigus populicaulis* Fitch).—Irregularly globular, with a mouth-like orifice at the base on one side. On poplar at the junction of the stem and the leaf. Common.

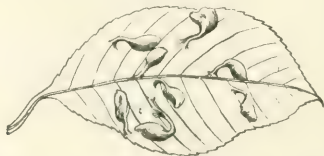


86. **Hickory Louse Gall** (*Phylloxera caryocaulis* Fitch).—Globular or hickory-nut shape. Hollow inside and filled with lice. When fully grown it bursts open and becomes cup-shaped. Green and leathery. On twigs and leaf-stalks of hickory. May and June. Very common.

ACARINA. (Mites.)

FAMILY ACARIDÆ.

The members of this order are minute insects closely allied to the spiders. They are parasitic upon animals, man and plants; a certain number produce galls.



87. **Wild Cherry Pouch Gall** (*Acarus serotinae* Beuten.).—Stem-like, expanding at the end into a pouch-like sack. About $\frac{1}{8}$ in. long. Hollow, with an exit on under side of leaf. Green or red. In numbers on leaf of wild cherry (*Prunus serotina*). Common.

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